huka

service manual

Skwirrel II

06-2009

introduction

Welcome to the first edition of the service manual for Skwirrel II. This manual is meant to be a guideline for repairing and servicing the wheelchair in the most efficient way. Good preventive maintenance and fast service provides optimal mobility for our wheelchair users. As Huka we think this is the key factor for happy wheelchair drivers. They should rely on our products and enjoy the freedom these products can give. Remember we are providing not a wheelchair, we are providing mobility and freedom of movement.

You as a local supplier are playing a very important role in this process. If the service is good, the customer will be happy with the product and of course their supplier. If the user has to wait long for repair, this will damage our product, but also your reputation as a local supplier.

Our common goal is to make sure the wheelchair is and stays in perfect condition. Should there be a problem (which will always happen) the quality of the mobility provided by us and you is related to the response of the local supplier. If the supplier can fix the problem is a fast and proper way, it will have great positive influence on the user.

In this manual we try to explain step by step how to replace parts of the wheelchair. When it comes to adjusting after installing, this will also be mentioned and explained. We try to support you with as much information as possible. However, should you find passages which are not clear to you or information missing about certain issues, please do not hesitate to inform us. Only this way we can make this manual even better.

you can reach us at: e.vanolst@huka.nl

Index

chapter			page
1	taking the covers off.		4
	1.1	taking the top cover off	4
	1.2	taking the side panel covers off	5
2	2.1	placing or replacing the batteries	6
	2.2	replacing the main fuse	9
3	replacing the wheels and tyres		10
	3.1	replacing the front tyres	10
	3.2	replacing the rear tyres	14
4	re-adjusting the parking brake		17
5	Adjusting the front suspension		19
6	replacing electronic components		20
	6.1	replacing the side steering joystick module	20
	6.2	replacing the desktop steering joystick module	21
	6.3	replacing the ISM module	22
	6.4	replacing the PM module	23
7	replacing cables		24
	7.1	replacing the cable from joystick to the ISM	24
	7.2	replacing the cable from the ISM to the PM	28
	7.3	replacing the lighting cable of the chassis	29
8	replacing the drive motors		30
9	replacing the actuators		35
	9.1	replacing the seat lift up actuator	35
	9.2	replacing the seat lift down actuator	37
	9.3	replacing the seat tilt actuator	39
	9.4	replacing the seat tilt switch	42
10	Lights and indicators		44
	10.1	replacing the head light bulb	44
	10.2	replacing the indicator bulb	45
	10.3	replacing the rear light bulb	45
11	The electronic system		47
	11.1	the joystick module	47
	11.2	the intelligent seating module	47
	11.3	the power module	48
12	safety inhibits of the wheelchair		49
	12.1	inhibits input	49
	12.2	Skwirrel II inhibits	50
13	system errors		51
14	programming		52
	14.1	setting up the programming	52
	14.2	programming the driving profiles	53
	14.3	setting the speeds parameters	57
15	system tests		61
	15.1	PM status	62
	15.2	ISM status	63
	15.3	JSM status	64
	15.4	Joystick status	65
	15.5	system logs	66
16	Drawings		69

1. Taking the covers off.

1.1 taking the top cover off

step 1.
Loosen the knob at the back end of the top cover.

step 2.
Loosen up both knobs at the front of the top cover.

step 3.
Lift up the rear end of the top cover so the thread pin comes out of the frame tube.

step 4.

Carefully pull the front end of the top cover a little forward so the mounting hole is clear of the pin.

step 5.
Now you can lift up the top cover and take it away from the chassis.

NOTE:
The mounting of the covers will take place in reverse order.

1.2 taking the side covers off

step 1.
Loosen up the bolt in on the front side.

step 2.
loosen up the screw on the rear end.

step 3.
take away slowly and carefully the side cover.

NOTE:
The mounting of the covers will take place in reverse order.

2.1 Placing or replacing the batteries

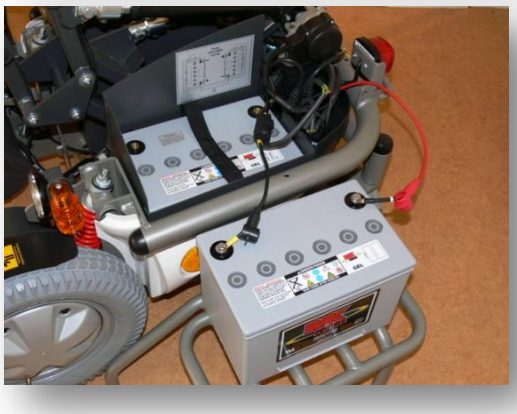
step 1.
Put the seat in its highest position, so it is easier to reach
the batteries. Should this be not possible, leave the seat in the position.

step 2.
Take the top cover of as explained in chapter 1, page 4.
loosen the two knobs in the front and the one in the rear
and lift the top cover of the chassis.

step 3.
Disconnect the cables from the batteries.

WARNING:
Make sure you isolate the contact of the cables to prevent short circuit errors.

step 4.
if the seat is still in the lowest position, connect the new and charged batteries to the chair. Place the batteries close to the wheelchair and connect them. Now you can put the seat lift in its highest position.

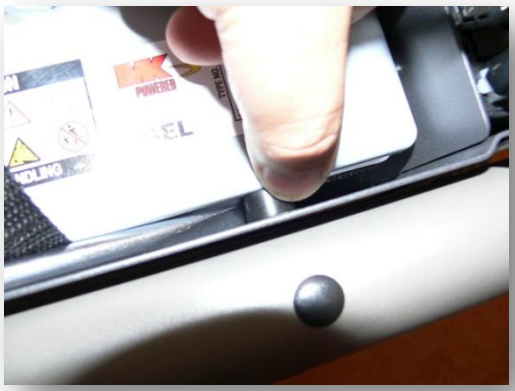


step 5.
Lift the used batteries out of their boxes using the grip handle on the battery.

step 6.
If you lift the battery, some rubber buffers will come off. Collect them, because they are needed to secure the new batteries.

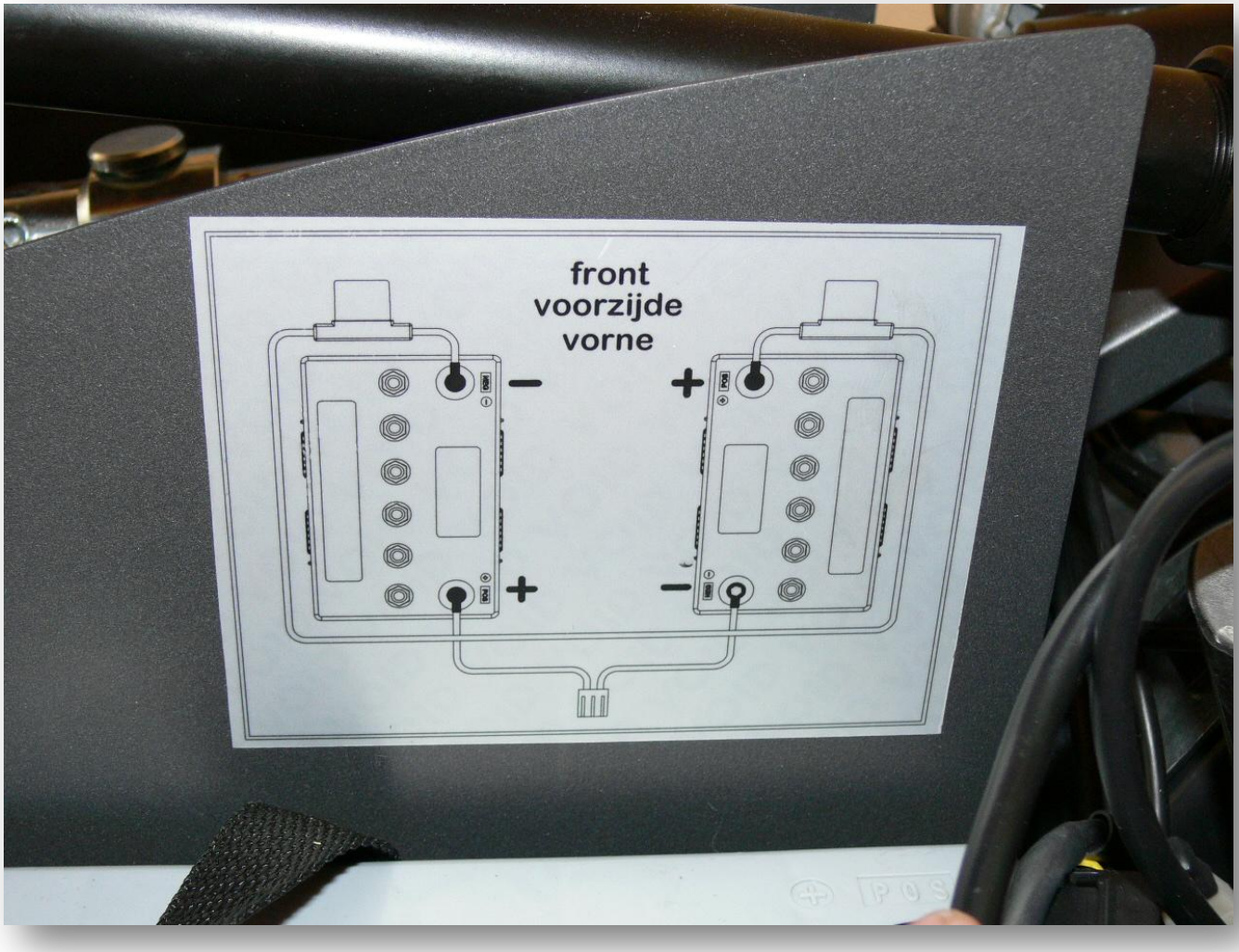
step 7.
now put the new battery carefully into the battery box. Make sure no cable gets stuck between the battery and the battery box. slowly lower the battery until it sits on the bottom of the battery box. Make sure the connections of the battery are on the inside of the chassis (see arrows)

step 8.
place the rubber buffers between the battery box and the battery. Place two on each long side of the battery. This way the batteries are secured and don't move around whilst driving on bumpy roads.



step 9.
Connect the cables back on to the battery.

WARNING:
Make sure you connect the rights poles in to the right cables. Wrong connections lead to short circuit!



The information about connecting the batteries is shown on the battery box sticker.

step 10.
Place the cover back on to the chassis and secure it with the three knobs.

2.2 replacing the main fuse

WARNING:
If the main fuse is broken, it means there is a serious short circuit or overload of the electronic system. Check the system before replacing the main fuse.

step 1.
take the main covers off

step 2.
open up the fuse holder which is positioned on each of the batteries.

step 3.
Is the fuse broken, check first if there is any damage on the battery cables or if there has been an extreme driving load on the system (extreme up hill driving for a long period).

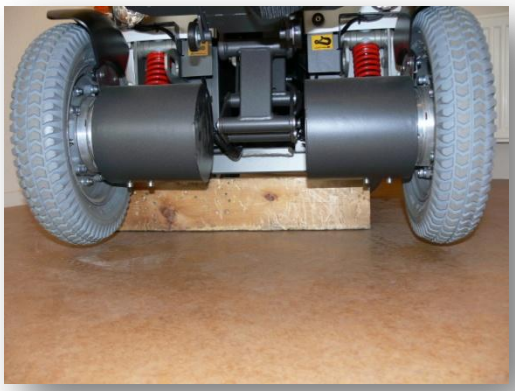
step 4.
Loosen the two nuts which hold the fuse and replace the fuse.

step 5.
Test the wheelchair before putting the covers back ion to it.

3. Replacing the wheels and tyres

3.1 replacing the front tyres

step 1.
First, lift the wheelchair chassis up and place a block underneath the chassis. This way the front wheels are lifted and free from the ground. Make sure the parking brake is still on.



step 2.
Remove the centre bolt which holds the wheel cover.

step3.
Lift the wheel cover out of the rim by using a flat screw driver. Lift the cover carefully so you don't get scratches.

step 4.
loosen up the five M8 nuts. the wheel is now loose on the motor hub.

step 5.
Take the wheel of the wheel hub.

step 6.
Remove the plastic bolt covers of the bolts.

step 7.
Mark the bolts on the rim. This is important when assembling the rim again. If these bolts are mounted on to the wrong hole, the wheel covers will not fit.

step 8.
Release the air from the tyre by pushing the valve open.

step 9.
Loosen the five bolts which keep the two rim parts together.

step 10.
Split the rim and remove the tyre and tube.

step 11.
Put the new tyre and tube on to the rim and bolt the rim back together again. Do not tighten the bolts yet!

WARNING:
Make sure you put the bolts back in to the marked holes. Otherwise the wheel cover will not fit.

step 12.
Put the rim back on to the wheel hub. This will put all holes in line so the wheel will fit on to the wheel hub easily. No, tighten two of the five bolts to fixate the rim parts.

step 13.
Tighten all five bolts now.

step 14.
Fill the tyre with air up to 2,5 Bar pressure.

step 15.
Put the plastic bolt covers on to the five bolts. These bolt covers fixate the plastic wheel cover and prevent it from vibrating during driving.

step 16.
Bolt the wheel now back on to the wheel hub.

step 17.
Place the wheel cover over the plastic bolt covers.

step 18.
Tighten the central wheel cover bolt.

3.2 replacing the rear tyres

step 1.
Lift the rear end of the wheelchair and put a support under the rear axle so the rear wheels are free of the ground.

step 2.
Lift off the central nut cover with a flat screw driver.

step 3.
Loosen the M8 central wheel bolt.

step 4.
Pull the wheel of the rear axle.

step 5.
Loosen all five bolts of the rim.

step 6.
Carefully split the two rim half parts by splitting it with a flat screw driver.

step 7.
Replace the tyre and tube (or the solid tyre).

step 8.
Place both rim parts back on to the tyre. Make sure you line out the valve opening of the rim.

step 9.
Tighten the five bolts on the rim. After doing this pump up the tyre up to 2,5 Bar pressure. If the tyre is solid you only need to tighten the five bolts.

step 10.
Place the wheel back on to the rear axle. Before doing this, put al little grease on to the axle to prevent it from corrosion. Tighten the M8 nut.

WARNING:
Don't tighten the nut to hard. If it tightened to hard the ball bearings might get damaged. Make sure the wheel rotates easily

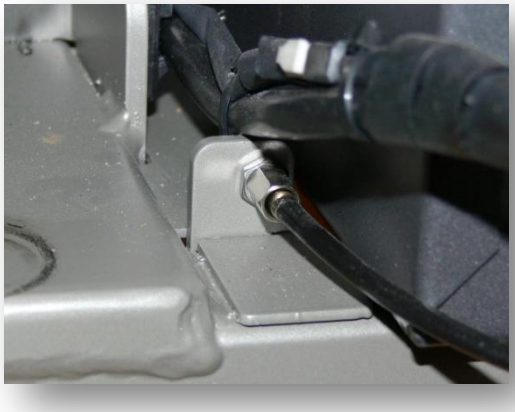
step 11.
Put the central wheel cover bat in to the hole of the rim.

4. Re-adjusting the parking brake

brake lever switched on

parking brake released

position adjustment tubes



close up adjustment tube

The parking is using two Bowden cables running from each drive motor to the parking brake lever at the rear end of the chassis. The Bowden cable hardly brakes, but it can stretch a little bit after a while. This will result in a wheelchair which is not easy to push when in freewheel position. If the Bowden cable in to thight it might result in a noisy drive motor. The kind of noise is a fast clicking sound and a kind of coughing noise is coming from the drive motor. This means the parking brake has to be re-adjusted.

step 1.
Make sure the Bowden cable is tightened well at the parking brake lever.

step 2.
Adjust each adjustment tube separately. First loosen the fixation nut of the adjustment tube. Turn the adjustment tube clockwise to decrease the tension of the Bowden cable. Turn the adjustment tube counter clockwise to increase the tension of the Bowden cable.

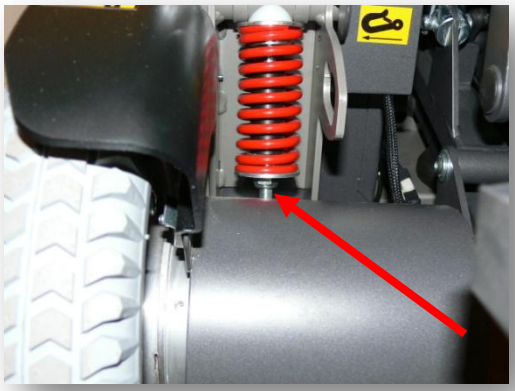
step 3.
if the parking brake lever is in to release setting the wheelchair should be easy to push. When the wheelchair is switched on, the display of the joystick module should show a warning text telling “M1 brake error”. If it tells “M2 brake error” it means the left motor (M1) hasn’t been adjusted tight enough.

NOTE:
A parking brake which is adjusted without any tension doesn’t influence the driving of the wheelchair. It only influences the free wheel mode of the wheelchair. It results in a wheelchair which is very heavy to push in free wheel mode.

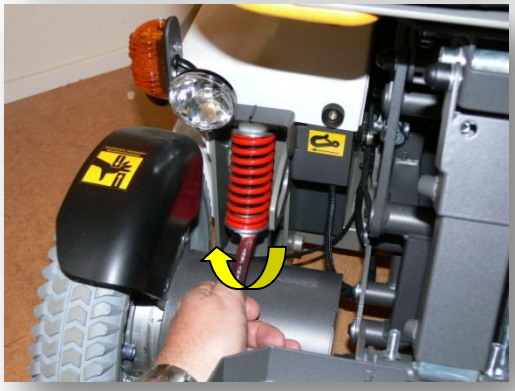
5. Adjusting the front suspension.

The front suspension is by default adjusted to the maximum user weight of 50 kg. Should it be required to change the setting of the suspension take notice of the following steps:

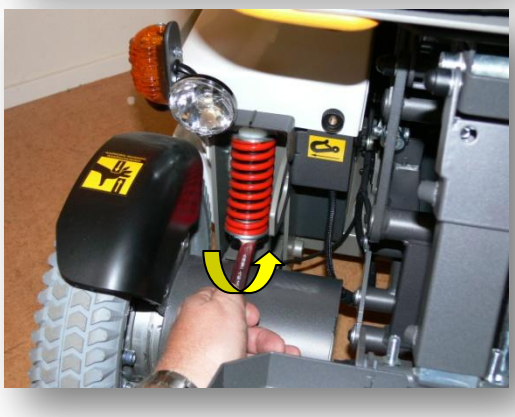
step 1.
Each spring damper unit has a nut underneath the spring. This nut needs to be moved to change the spring load.



step 2.
<u>softer suspension.</u>
Use a wrench to move the nut down to reduce the tension on the spring. Now the suspension is softer.



step 3.
<u>stiffer suspension.</u>
Use a wrench to move the nut up to increase the tension on the spring. Now the suspension is stiffer.



NOTE:
The suspension setting is a balance between grip and driving comfort. A very stiff suspension means good mechanical grip, but very little driving comfort. To soft suspension means high driving comfort but very little mechanical grip. This results in very poor driving handling of the wheelchair. Make sure you always have a good balance between these two parameters.

NOTE:
Make sure both sides are adjusted equally. Check after adjusting the length of the spring on both sides. If the length is the same, the adjustment is the same.

6. Replacing electronic components of the wheelchair.

6.1 replacing the side steering joystick module.

step 1.
Switch off the wheelchair and disconnect the cable of the joystick module.

step 2.
loosen the two bolts underneath the mounting plate.

step 3.
Replace the unit by a new one.

step 4.
tighten the two mounting bolts again.

step 5.
connect the cable and start the wheelchair. It will run a handshake protocol. After this protocol, switch off and on again. The wheelchair is now ready for use.

6.2 replacing the desktop steering joystick module.

step1.
Disconnect the connector of the joystick module.

step 2.
Use a flat screwdriver to loosen the bolt of the joystick module guide on one side.

step 3.
Loosen the other bolt of the joystick module and take away the joystick module guide on one side.

step 4.
Loosen up one of the bolts on the other joystick module guide on the other side. At the same time hold the joystick module with one hand so it can't fall down. Now loosen the last bolt a little bit. You will notice you now take the joystick module away.

replace the unit by a new one.

NOTE:
The mounting of the new joystick module will take place in reverse order.

6.3 replacing the ISM module.

step 1.
Remove the top cover of the chassis as mentioned on page 4.

step 2.
Remove the cable connections of the left battery as mentioned on page 6

WARNING:
Make sure you isolate the contact of the cables to prevent short circuit errors.

step 3.
Lift the battery slowly out of the battery box.

step 4.
Loosen the four bolt which hold the ISM on to the battery box.

step 5.
Lift the ISM module. Disconnect the cables and replace the module.

NOTE:
The mounting of the new part will take place in reverse order.

After installing the new part, restart the wheelchair so the system can start calibration. After a few seconds the system will tell you to shut down and restart the wheelchair. The wheelchair is now ready for use.

6.4 Replacing the PM module.

step 1.
remove the top cover of the chassis as mentioned on page 4.

step 2.
Remove the cable connections of the left battery as mentioned on page 6.

WARNING:
Make sure you isolate the contact of the cables to prevent short circuit errors.

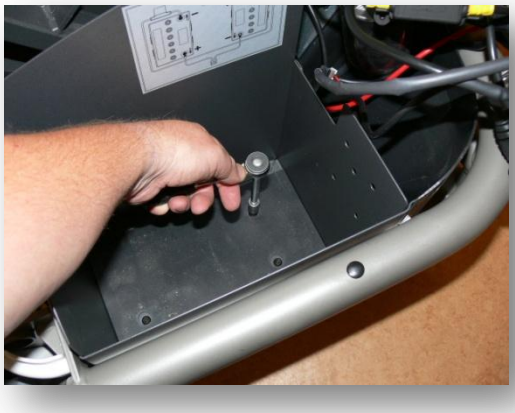
step 3.
Lift the battery slowly out of the battery box.

step 4.
Loosen the four bolt which hold the ISM on to the battery box.

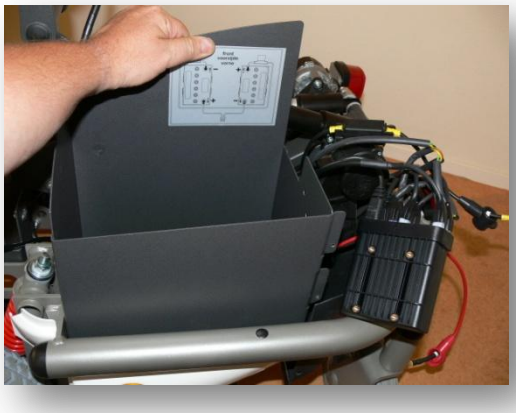
step 5.
Lift the ISM module and put it aside so the battery box can be removed.

step 6.
Loosen the two screws of the plastic side covers.

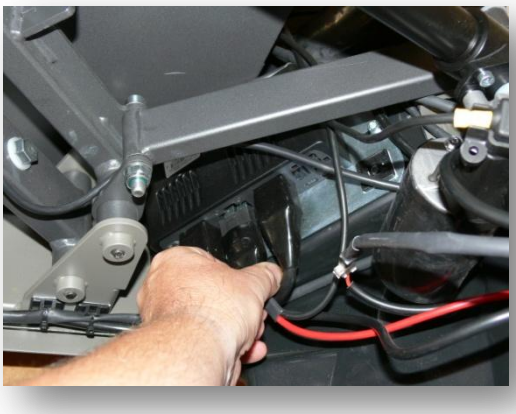
step 6.
Loosen the three bolts on the bottom off the battery box.



step 7.
Lift the battery box out of the frame.

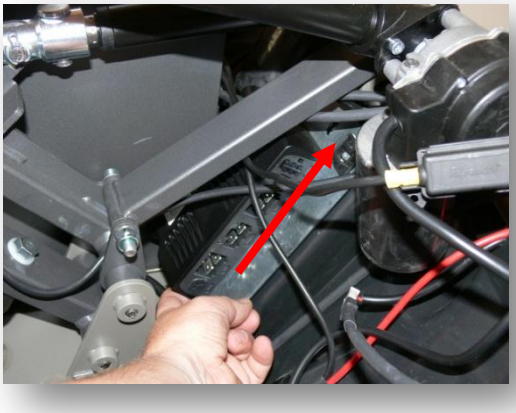


step 8.
Disconnect the cables from the power module.



step 9.
Loosen the top bolt of the power module. This bolt works like a lock and holds the power module in place.

step 10.
now move the power module a little upwards. Now the two bolts on the bottom side will be released.



step 11.
Remove the power module from the mounting plate and replace it.

NOTE:
The mounting of the new part will take place in reverse order.

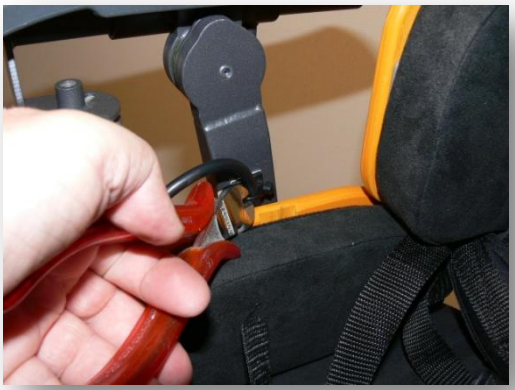
After installing the new power module you need to load the right software program in to the power module using the dongle and the PC program.

7. Replacing cables.

7.1 replacing the cable from joystick to the ISM.

step 1.
Put the seat lift in its highest position.
Remove the top cover of the chassis as mentioned on page 4.

step 2.
Cut the cable ties which keep the cable in pace.



step 3.
Follow the cable al the way and cut all the cable ties.
Also notice the way the cable is lead trough the system.
make sure you place the new cable in the exact same way. Unplug the conncector in the ISM module.

step 4.
put the new cable in place and make sure you lead the cable in the exact same way as it was. This is very important.

WARNING:
Make sure you lead the cable like the old cable. Leading the cable through another way might damage the cable and cause an error

step 5.
Fix the cable into position using cables ties. DO NOT tighten the cable ties firmly but leave them quite loose so the cable can easily slive and move through the loop of the cable tie.

WARNING:
Make sure the cable is not fixed tight by the cable ties. This might damage the cable whilst moving.

step 6.
Connect the cable to the joystick module and fix the cable with cable ties.
Before putting the top cover back on the chassis move the seat lift totally down to the ground and to its highest position. During this moving down and up check if the cable can move and is not stressed in any way.

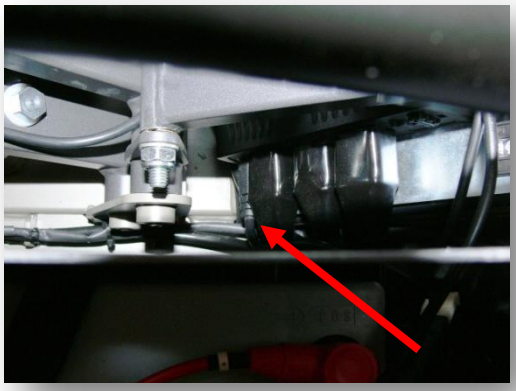
step 7.
Put the cover back on to the chassis.

7.2 replacing the cable from the ISM to the PM.

step 1.
Remove the cover from the chassis as mentioned on page 4.

step 2.
Disconnect the cable fro mthe ISM module.

step 3.
Disconnect the cable from the PM module.



step 4.
Remove the cable and replace it by a new one.

NOTE:
The mounting of the new part will take place in reverse order.

7.3 replacing the lighting cable of the chassis.

step 1.
Remove the cover from the chassis as mentioned on page 4.

step 2.
Disconnect the rear light left and the rear light on the right side.

step 3.
Cut the cable ties on the lighting cable in the front of the wheelchair.

step 4.
Disconnect both connectors of the lights in front.
Remove the cable gently out of the chassis.

step 5.
Place the new cable into the chassis and connect the cable to the lights.

WARNING:
The front left and front right lights use different connectors. Make sure the right cable part end up at the right connector. The front left connector is 3-pin, front right connector is 4-pin.

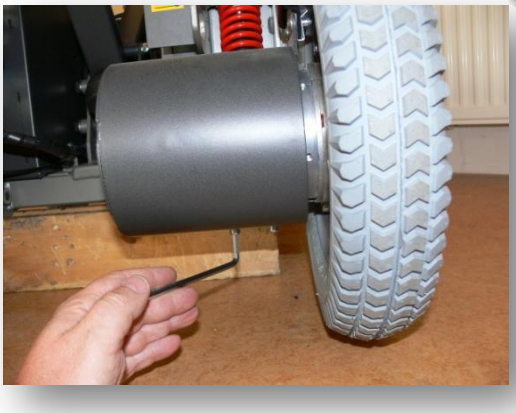
step 6.
Test the light functions to see if the connections are made correctly. If everything is OK, fix the cable with cable ties.

step 7.
Put the top cover back on to the chassis.

8. Replace the drive motors

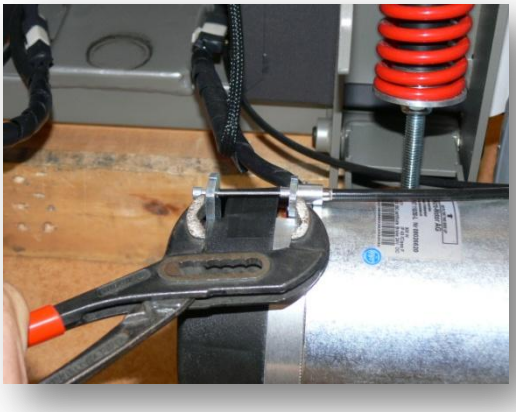
step 1.
First, lift the wheelchair chassis up and place a block underneath the chassis. This way the front wheels are lifted and free from the ground. Make sure the parking brake is still on.

step 2.
Loosen the two bolts of the motor cover.



step 3.
Take off the motor cover.

step 4.
Use a multiple pliers to press both lever parts towards each other. Now the Bowden cable can be released from the braking lever.



step 5.
Now removed the Bowden cable out of the holder of the drive motor.

step 6.
Loosen the central bolt of the wheel cover.

step 7.
Remove the wheel cover by lifting it with a flat screw driver.

step 8.
Loosen the five wheel nuts and take the wheel off.

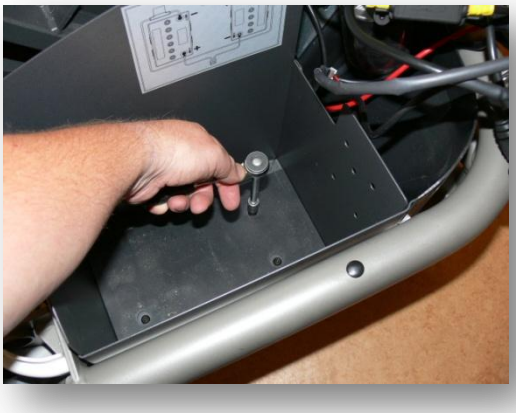
step 9.
Loosen the 4 bolts of the motor frame. There are two bolts on top and two bolts at the bottom area of the drive motor.

step 10.
Take the top cover of the chassis as mentioned on page 4.

step 11.
Disconnect the left battery and lift it out of the battery box.

WARNING:
Make sure you isolate the contact of the cables to prevent short circuit errors.

step 12.
Loosen up the three bolts at the bottom of the battery box.



step 13.
Loosen the four bolts of the ISM module.

step 14.
Loosen the two screws of the plastic covers on the side of the battery box.

step 15.
Now place the ISM outside the frame and lift the battery box out of the chassis.

step 16.
Disconnect the drive motor connector from the power module.

step 17.
Replace the drive motor.

NOTE:
The mounting of the new part will take place in reverse order.

9. Replacing actuators.

9.1 replacing the seat lift up actuator

step 1.
Remove the top cover of the chassis.

step 2.
Loosen the two nuts of the mounting bolt and remove them.

step 3.
Remove the washers of the bolt.

step 4.
Remove the split pen at the front joint of the actuator.

step 5.
Push the pin out so the actuator head is released from the lift arm.

WARNING:
If the seat lift arm is in its lowest position, you can take the pin out without any problem. Should the seat lift NOT be in its lowest position, the actuator is still lifting the seat lift. If you then remove the pin, the seat lift will sudden drop down. This can cause a hazardous situation. Be aware of this risk.

step 6.
Disconnect the two connectors of the actuator from the ISM module.

step 7.
Push the mounting bolt in the rear end of the actuator further to the left, so it is possible to remove the actuator from the bolt.

step 8.
Replace the actuator unit.

NOTE:
The mounting of the new part will take place in reverse order.

9.2 replacing the seat lift down actuator.

step 1.
Remove the top cover of the chassis.

step 2.
Removed the split pen form the actuator head at the front of the actuator.

step 3.
Loosen the nuts at from the mounting bolt at the rear end of the actuator.

step 4.
Put a safety strap between the seat frame and the rear and of the chassis.

WARNING:
If the seat lift arm is in its highest position, you can take the pin out without any problem. Should the seat lift NOT be in its highest lowest position, the actuator is still lifting the seat lift. If you then remove the pin, the seat lift will sudden drop down. This can cause a hazardous situation. Be aware of this risk.

step 5.
Disconnect the two connectors of the actuator from the ISM module.

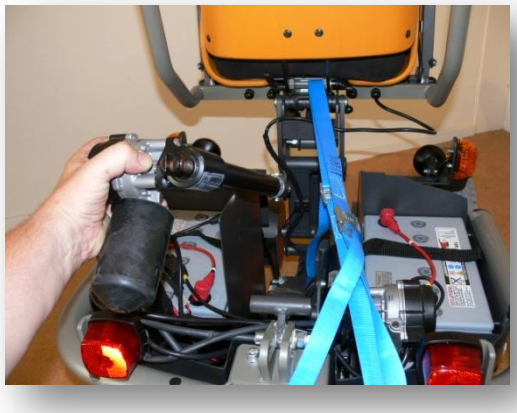
step 6.
Remove the pin out of the actuator head in the front part of the actuator.

WARNING:
If the seat lift arm is in its highest position, you can take the pin out without any problem. Should the seat lift NOT be in its highest lowest position, the actuator is still lifting the seat lift. If you then remove the pin, the seat lift will sudden drop down. This can cause a hazardous situation. Be aware of this risk.

step 7.
Remove the bolt out of the actuator mounting so the actuator can be taken out.

WARNING:
If you take the bolt out, the other actuator gets loose as well. Washers might fall down if you don't notice them. Please remove them before they fall.

step 8.
Now the actuator can be replaced.



NOTE:
The mounting of the new part will take place in reverse order.

9.3 replacing the seat tilt actuator.

step 1.
Remove the top cover of the chassis.

step 2.
Move the seat in a position where is easy to reach the rear end mounting bolt of the seat tilt actuator.

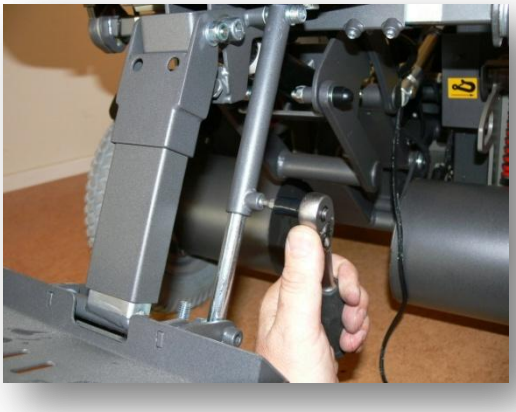
step 3.
Disconnect the actuator from the ISM module.

step 4.
Cut the cables ties along the way of the actuator cable.

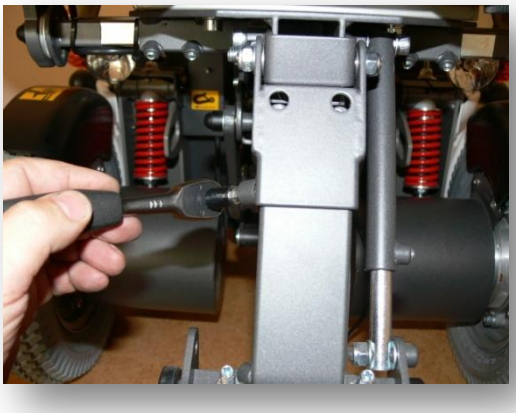
WARNING:
Make sure you keep in mind how the cable was lead through the wheelchair. Like the old cable. Leading the cable of the new actuator through another way might damage the cable and cause an error.

step 5.
Check also the way the cable has been lead through this area. Make sure you lead the cable back the same way.

step 6.
Loosen up the adjustment screw of the legrest parallel bar.

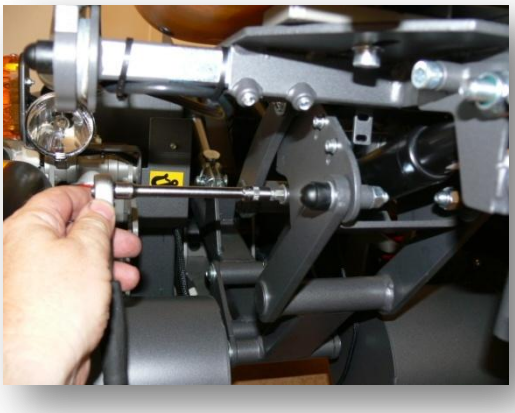


step 7.
Loosen the legrest tube as well. Now you can remove the legrest. This is done to have a better access to the front of the seat frame.



step 8.
Loosen the nut of the rear mounting bolt of the seat tilt actuator.

step 9.
Loosen the bolt from the other side and remove it.



WARNING:
If this bolt is taken out, the seat will drop backwards. Make sure you hold the seat with one hand when you remove top bolt. Now you can slowly tilt the seat backwards.

step 10.
Slowly tilt the seat backwards.

step 11.
Remove the front mounting bolt of the actuator.
Be aware when you pull the bolt, some spacers might fall from the bolt. These spacers are needed to remount the new actuator.

step 12.
Replace the actuator.

NOTE:
The mounting of the new part will take place in reverse order.

9.4 replacing the seat tilt switch.

step 1.
Remove the top cover of the chassis.

step 2.
Remove the connector of the seat tilt switch from the power module.

step 3.
cut the cable ties and remove the cable from the seat elevator.

WARNING:
Make sure you keep in mind how the cable was lead through the wheelchair. Like the old cable. Leading the cable of the new actuator through another way might damage the cable and cause an error.

step 4.
Check also the way the cable has been lead through this area. Make sure you lead the cable back the same way.

step 5.
Loosen the two bolts which hold the switch mounting plate.

step 6.
Take out the switch from the seat frame. Now cut the cable ties to release the switch from the mounting plate.

step 7.
replace the switch and mount a new one to the mounting plate.

NOTE:
The mounting of the new part will take place in reverse order.

step 8.
After mounting the switch back on to the seat tilt frame, you have adjust the distance between the switch and the switch plate.

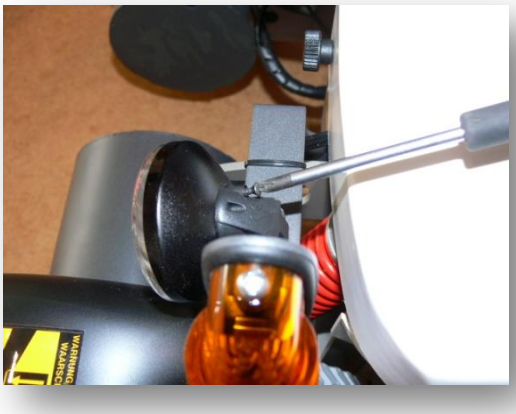
First, set the switch maximum to the right. and test if the switch is switching when it touches the switch plate (see red arrow). If not, move it a little closer to the switch plate until it reacts and switches when you move the tilt.

WARNING:
Make sure the switch is not to close to the switch plate. If it is to close the switch plate will crush the switch and it needs to be replaced, again.

10. Lights and indicators

10.1 replacing the head light bulb.

step 1.
Loosen the screw on the rear side of the headlight.



step 2.
Rotate the head light glass counter clockwise for around 60 degrees. Now the bayonet locking opens up.

step 3.
Carefully pull the headlight glass of the headlight.

step 4.
Remove the broken bulb out of the socket. To do this, turn the bulb counter clockwise.

NOTE:
These lights are 6 volt ! Both headlights are serial connected. So if one light is broken, the other one won't light up as well.

NOTE:
The mounting of the new part will take place in reverse order.

10.2 replacing the indicator light bulb.

step 1.
Remove the upper and lower screw from the indicator glass.

NOTE:
To remove the lower screw you should use a short screw driver. To reach this lower screw it is also possible to bend the light frame a bit.

step 2.
Remove the glass form the indicator frame.

step 3.
Remove the broken bulb and replace it by a new one.

NOTE:
The mounting of the new part will take place in reverse order.

10.3 replacing the rear light bulb.

step 1.
Lift off the rear light glass by lifting the bottom part up.
The glass will jump out of its fitting.

step 2.
Pull the rear light tube out of its socket.

step 3.
Replace the broken bulb by a new one.

step 4.
Push the glass back into the fitting and press it until you hear of feel a soft click.

11. The electronic system.

The electronic system of the Skwirrel II is based on the R-net system of PGDT. The system is based on three units; The JSM the JoyStick Module, the ISM Intelligent Seat Module and the PM Power Module.

11.1 the Joystick Module.

JSM module (Joystick Module), this is the control unit of the wheelchair. There are two models of these JSM modules: one for the side steering systems and one for the desktop control systems. With this unit your can drive the wheelchair, move the seat and use the lights and horn.

JSM side steering version *JSM desktop control version*

The unit for side steering also has connectors to connect external on/off and mode buttons.

11.2 the Intelligent Seating Module.

The **ISM module** (intelligent Seating Module), is the unit where the actuators and the lights are connected to. All commands which come from the JSM module concerning seat functions and lights are set into action by this module. These are outgoing signals.

ISM module

Beside the outgoing signals there are also signals coming into this module. These signals can be inhibit signals and position signals. These signals are being sent back to the main system. Also errors can be detected here. They are being send to the display and also stored in the memory of the unit. With the help of a PC we can read the stored error messages to know what is going on.

11.3 the Power Module.

The **PM (Power Module)**, this unit controls and checks the drive motors of the wheelchair.

PM module

The powermodule (PM) executes the drive commands which come from the JSM module. The unit also receives feedback from the motors. These two kinds of data are checked with each other to make sure the wheelchair does exactly what the user is telling him to do. Any errors concerning the motors, brakes and communication is registered here as well. It will store the codes and also send them to the JSM module to be displayed on the display.

The error codes can be read by a PC as well. On the module is an additional connector for charging the batteries. There is also an inhibit input connector. The module is protected against short circuit, overload, dust and water.

11.4 the speed kit (optional for 10 km/h version.)

The **speed kit** is used to make sure the wheelchair keeps it course when driving at high speeds. It includes a small electronic unit, a speed sensor and an actuator to activate the damping. The driving speed is measured by the speed sensor. At a speed of about 4 km/h the system will activate the actuator inside the rear axle. This actuator is pushing a damping device onto one of the rear castor wheel axles. This way the wheelchair is prevented from the so called “fishtail effect”. When the actuator moved out into its end position, it will also press a position switch. This is the feedback to the main PM module to tell the system is activated. By this signal the maximum speed of 10km/h is released.

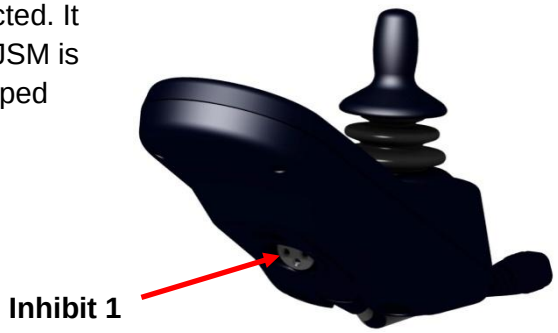
12. Safety inhibits of the wheelchair.

The R-net system uses so called inhibits. These are kinds of safety features which can activate, reduce or block functions of the wheelchair. There are speed reducing inhibits, drive inhibits and seat function inhibits. The inhibits are programmed inside the software of the R-net system. With this software you can define where the signal comes in, what value it should have and what needs to be blocked and how. The inhibit inputs are resistance sensitive. The range is from 0 ohm to 10Kohm. On inhibit can receive several different inhibit signals. Example: there can be one signal coming in of 1 Kohm and a signal of 4 Kohm. The 1 Kohm will be programmed to reduce the drive speed by 50%, The 4 Kohm will block the seat elevator for going up. Both signals will result in a resistance of 5 Kohm. If the system receives this information, it will activate both inhibits.

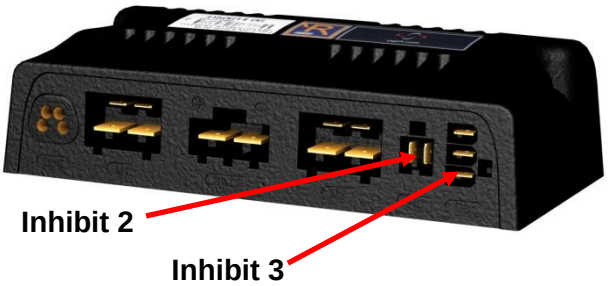
12.1 inhibits input

The R-net system has 5 inputs in the complete system:

1. Inhibit 1, charger plug JSM (control unit)
   This inhibits will be activated if the charger is connected. It will block the driving of the wheelchair. If a desktop JSM is used it will also block the driving when the unit is flipped over.

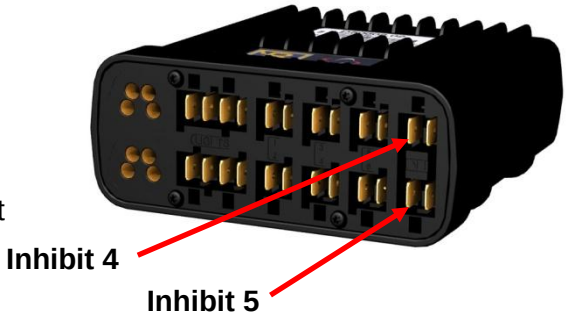


2. Inhibit 2, inhibit connector op de PM (power module). Here the seat tilt switch is connected. This inhibit blocks the seat elevator going down is the seat tilt is still active.



3. Inhibit 3, OBC (On Board Charging) connector
   On the PM (power module) this is where the feedback signal comes in from the speed kit. (if applied) It releases the maximum speed when the speed kit is activated.

4. Inhibit 4, inhibit connector on the ISM (Intelligent Seat Module) This is where the information of the seat actuator going up comes in.



5. Inhibit 5, inhibit connector on the ISM (Intelligent Seat Module) This is where the information of the seat actuator going to the ground comes in.

12.2 Skwirrel II inhibits.

The following inhibits are installed in the Skwirrel II system:

1. Charge inhibit (bridge inside the charger plug)(message in the display)
   This inhibit is activated if the charger is connected. It blocks the driving.
2. Flip over joystick module inhibit. (mercury switch inside the JSM module)
   This inhibit will be activated as soon as the desktop JSM module is flipped over.
   It blocks the driving.
3. Brake release Inhibit (switch in drive motor) (error message on display)
   As soon as the brakes are mechanically released, the driving will be blocked.
4. Seat tilt inhibit (switch on the seat frame)
   (only if powered seat function is mounted)
   When the seat tilt is active (tilted) is not possible to move the seat elevator to the ground.
5. Powered seat elevator going up inhibit (potentiometer inside actuator)
   Because the seat elevator is made out of two units: one for lifting the seat upwards and one for the seat moving down to the ground, there are also two separate inhibits. Each actuator has its own inhibit. If the seat elevator for going up is active, the seat elevator going to the ground is blocked and vice versa.

   Both inhibits also have influence on het driving speed. When the seat is not in its normal driving position, the drive speed will be reduced. When the seat is close to the ground the driving is even blocked.
6. Seat elevator to the ground. (Potentiometer inside actuator). This inhibit will block the seat tilt function when de elevator is moved down to the fround.
7. The end position inhibit of the seat actuator. Both seat elevator actuators have build in potentiometers which detect the end stop of the actuators. These end stop inhibits can also be used to make the elevator stop on a required position. For instance a child is not allowed to down to the ground completely because he or she cannot stretch the legs.
8. inhibit speed kit (switch on rear axle)
   (if speed kit is mounted)

   If the speed kit is not activated the speed of the wheelchair is reduced to 50%. If the speed kit is active and the actuator has moved to it active position the inhibit switch is pushed and the maximum speed is released.

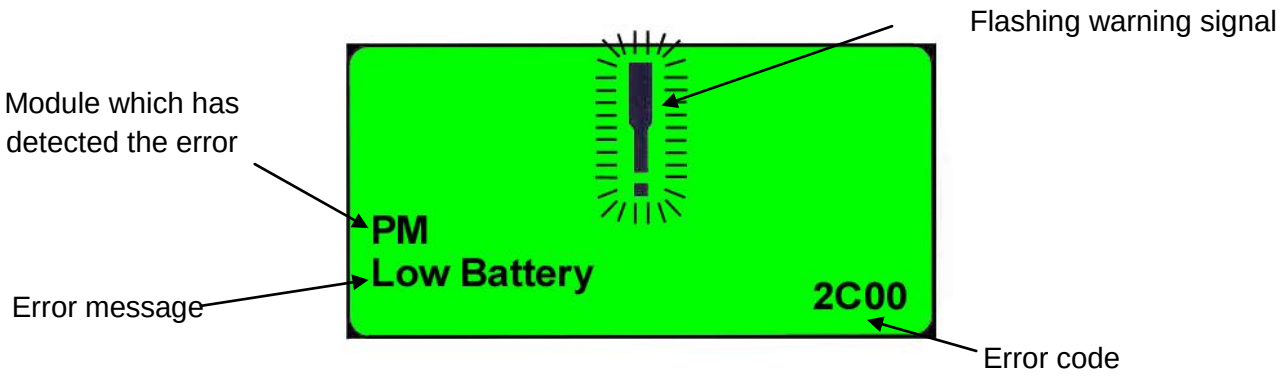
Beside these inhibits the actuators are additionally protected against overload by a current limit system. These current limits are also programmed in the software settings.

NOTE:
The inhibit settings are programmed in the OEM area of the wheelchair software. These settings can only be changed by special authorized persons who know all the ins and outs of the wheelchair programming. Please contact Huka B.V. for further information.

13. System errors.

error messages.

If there is a problem with the electric system of the wheelchair, the wheelchair will stop driving and an error code will be displayed of the JSM display. You will see different information on the little screen. First there is a flashing warning signal. Second, it will show who has detected the error. This can be the JSM, the ISM or the PM module. Should there be an Omni system mounted on the chair, this can also detect errors. Below this information you will see a short message of the error. And last but not least, in the right corner a hexadecimal error code is displayed. This code stands for a specific error. These codes can be checked on the WWW.PGDT.COM site. It will tell what could be the problem and how to handle.



All error codes are also stored in the memory of the JSM, ISM and PM modules. They can be read using the PC with dongle.

Erasing error codes

If the error has been detected and the problem has been solved, it is good to clean the memory of the modules. This way you know all previous information is gone. The registration of actual errors will not be “coloured” by old information.

NOTE:
Should there occur an error message, which is not mentioned on the PGDT.com website, please contact Huka B.V. immediately.

14. Programming.

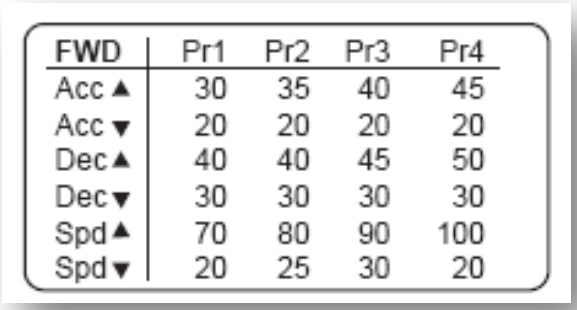
The electronic system of the Skwirrel II can be programmed to fulfil the requirements and needs of the wheelchair user. Programming can be done inv three ways:

1. Onboard programming

The programming is done directly on the joystick module. By pushing a certain code using the JSM buttons it is possible to enter the set up mode of the electronic system. For safety reasons, this programming method is blocked.

2. Onboard programming with dongle.

Also this programming is done directly on joystick module. To enter the set up mode, a R-net dongle must be connected to the R-net bus.



FWD	Pr1	Pr2	Pr3	Pr4
Acc ▲	30	35	40	45
Acc ▼	20	20	20	20
Dec ▲	40	40	45	50
Dec ▼	30	30	30	30
Spd ▲	70	80	90	100
Spd ▼	20	25	30	20

a screenshot of the set up mode

3. programming using the dongle and a computer.

This is the standard way the Huka Skwirrel II wheelchairs are programmed. For this programming a dongle and software is required. These dongles and software is available on request at Huka B.V.

14.1 setting up the programming.

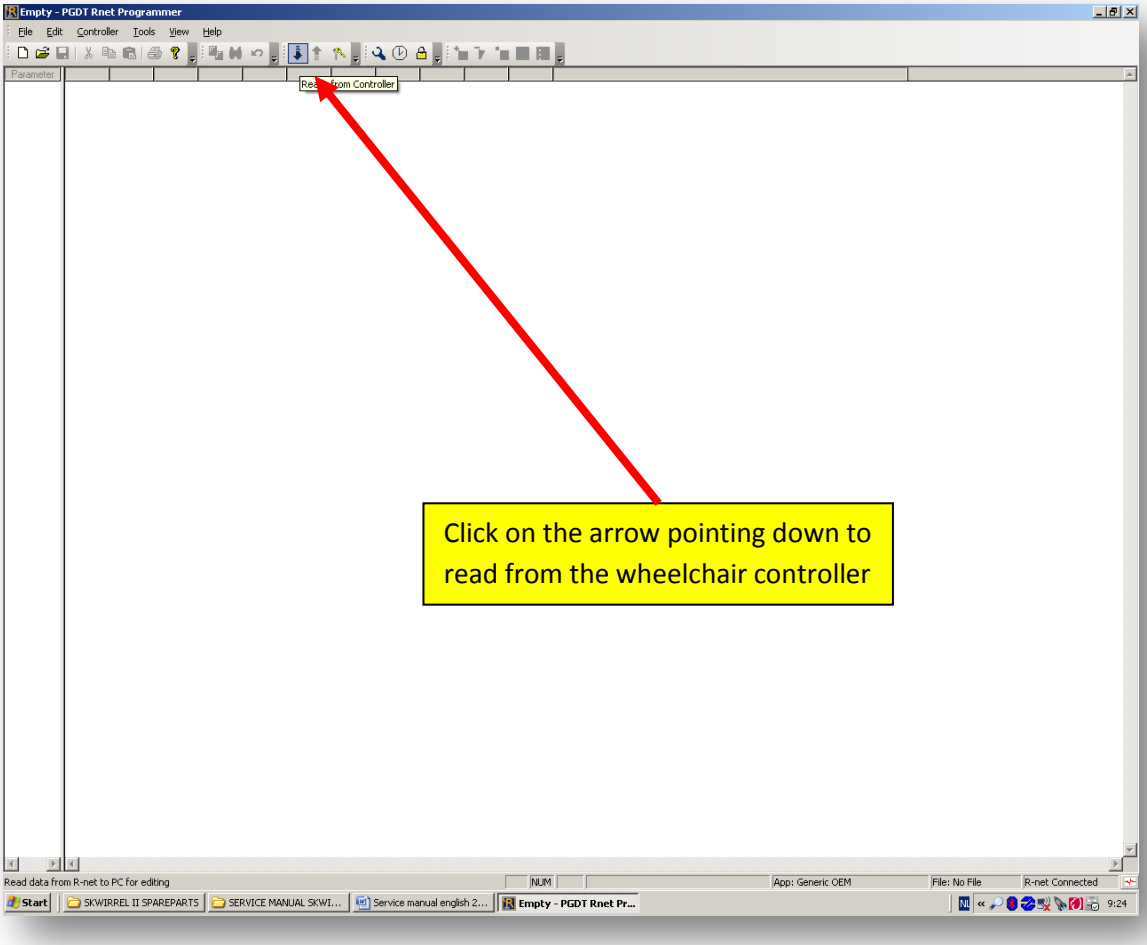
First the dongle will be connected to the bus system of the R-net electronic. The easiest way is to connect the dingle between the JSM module and the cable from the JSM to the wheelchair.

disconnecting the JSM module

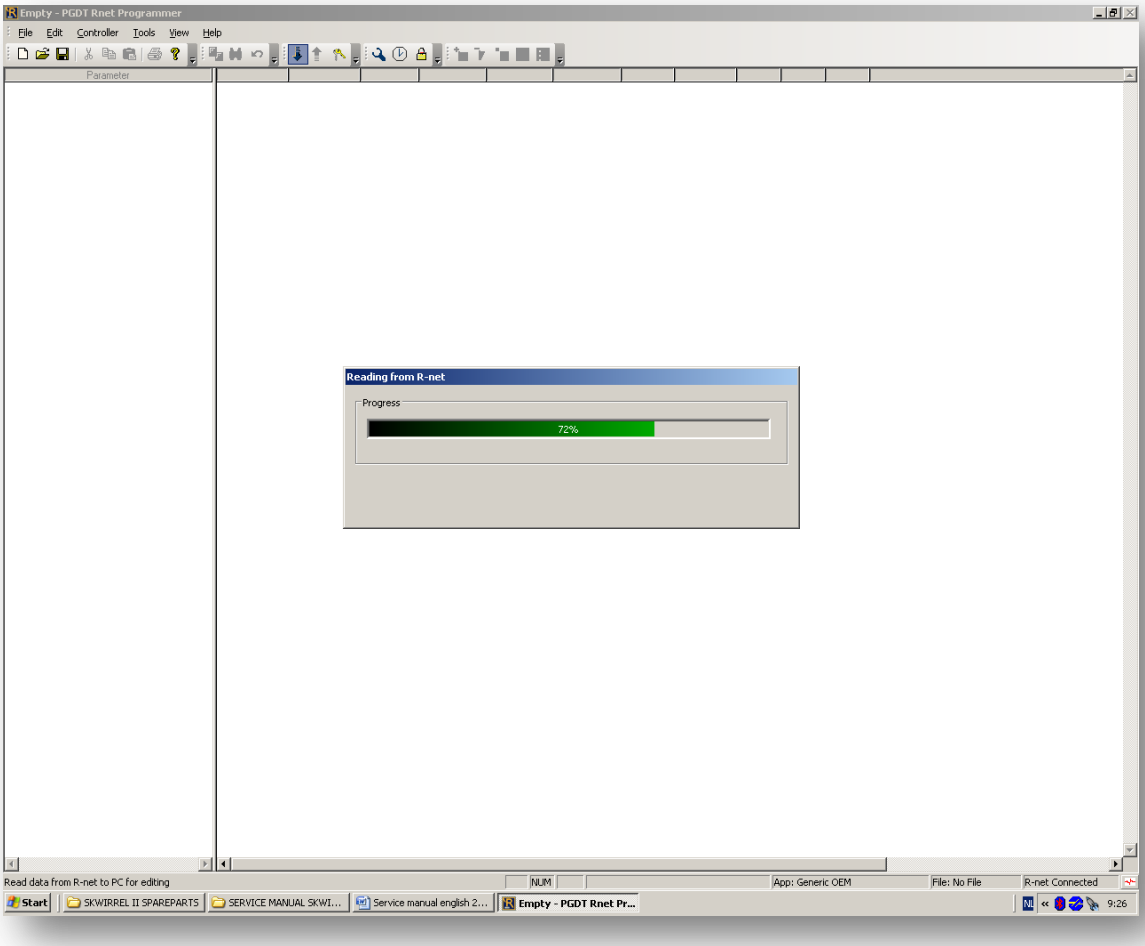
plugging in the dongle for programming

14.2 Programming the driving profiles.

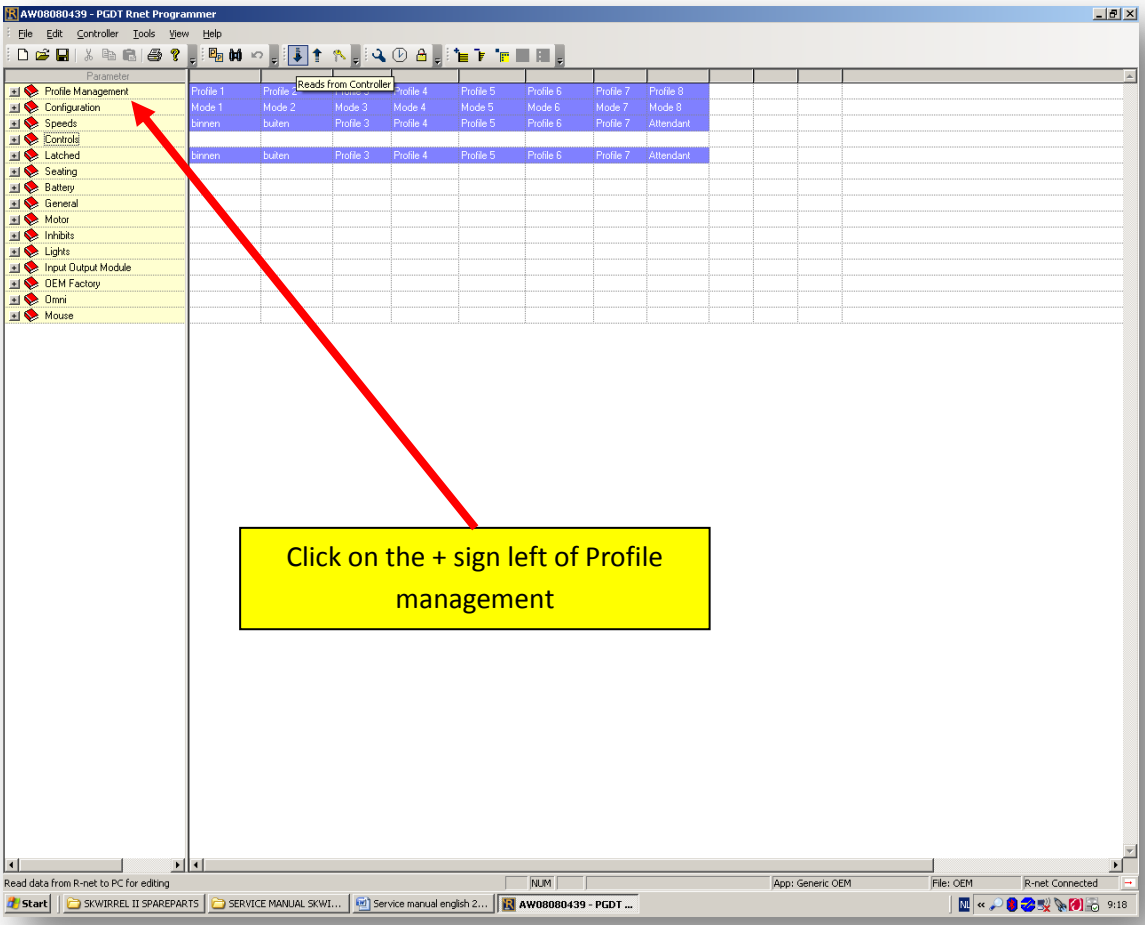
step 1.
The main programming feature is the setting of the driving characteristics of the wheelchair.
First, connect the dongle to the R-net system and the PC or laptop. Start up the software program and start up the wheelchair. At the start up of the software you will see a warning label. Click “continue” to start the program. Detailed information about programming is given is the additional programming Manual of PGDT.



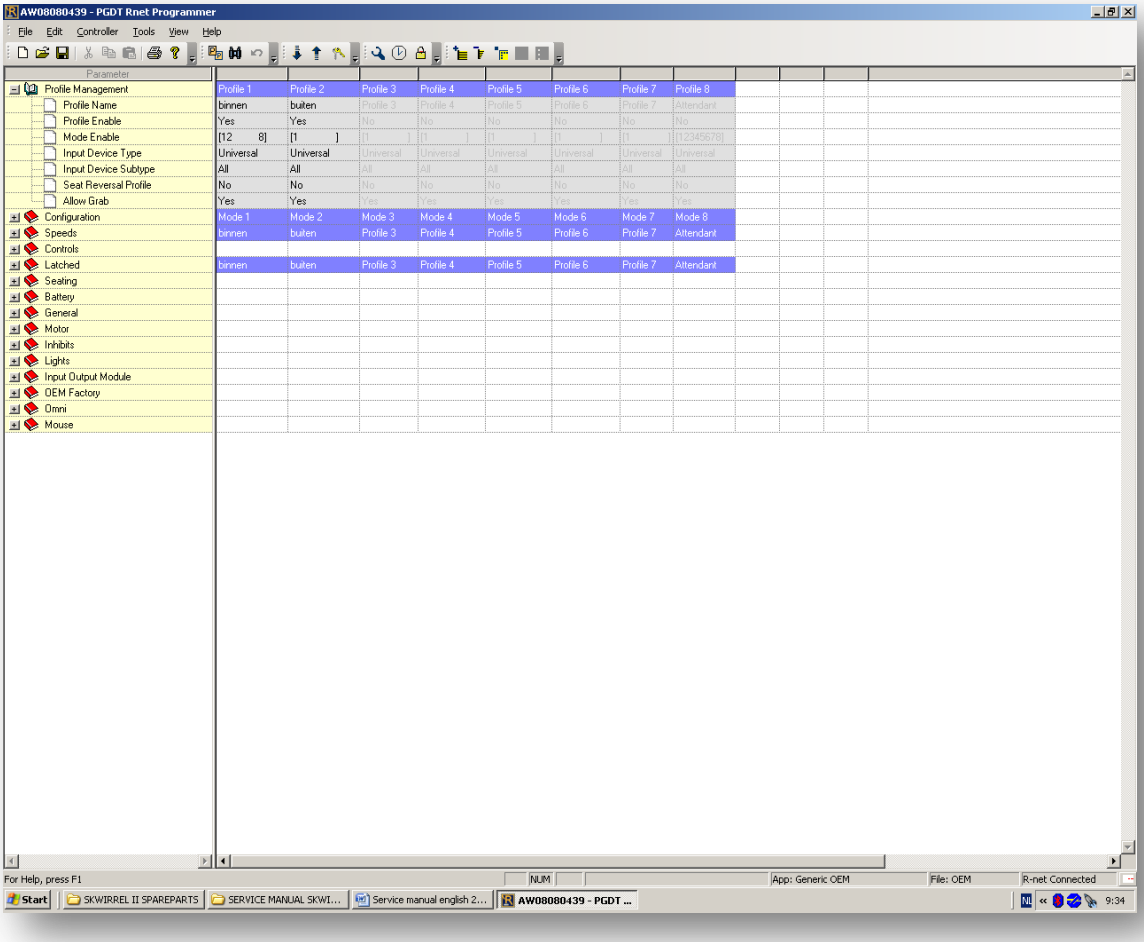
step 2.
Now click on the arrow is the top bar to read from the wheelchair controller. A small screen will open up telling the system is read from the controller.



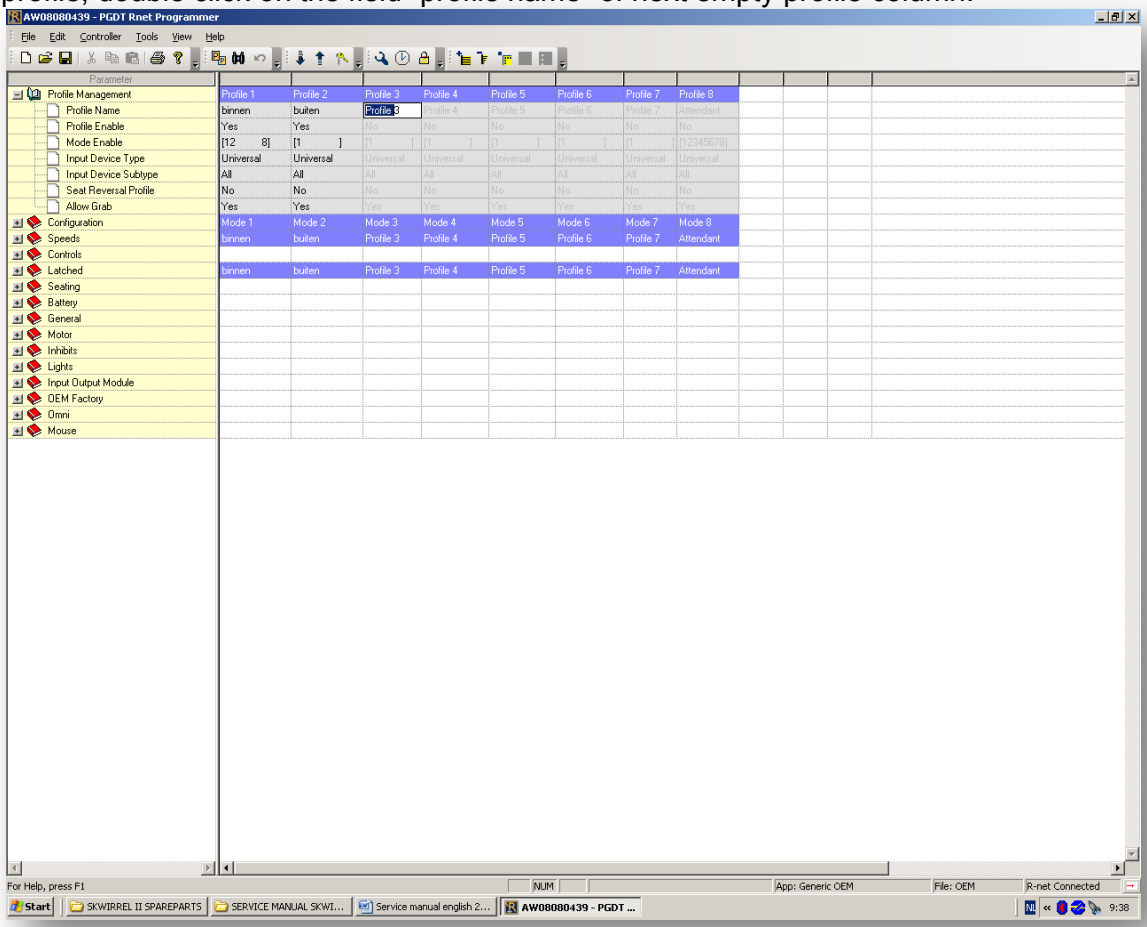
step 3.
now we can select one of the parameter groups to program.



step 4.
When the group opens up you'll see there are two standard profiles already programmed.

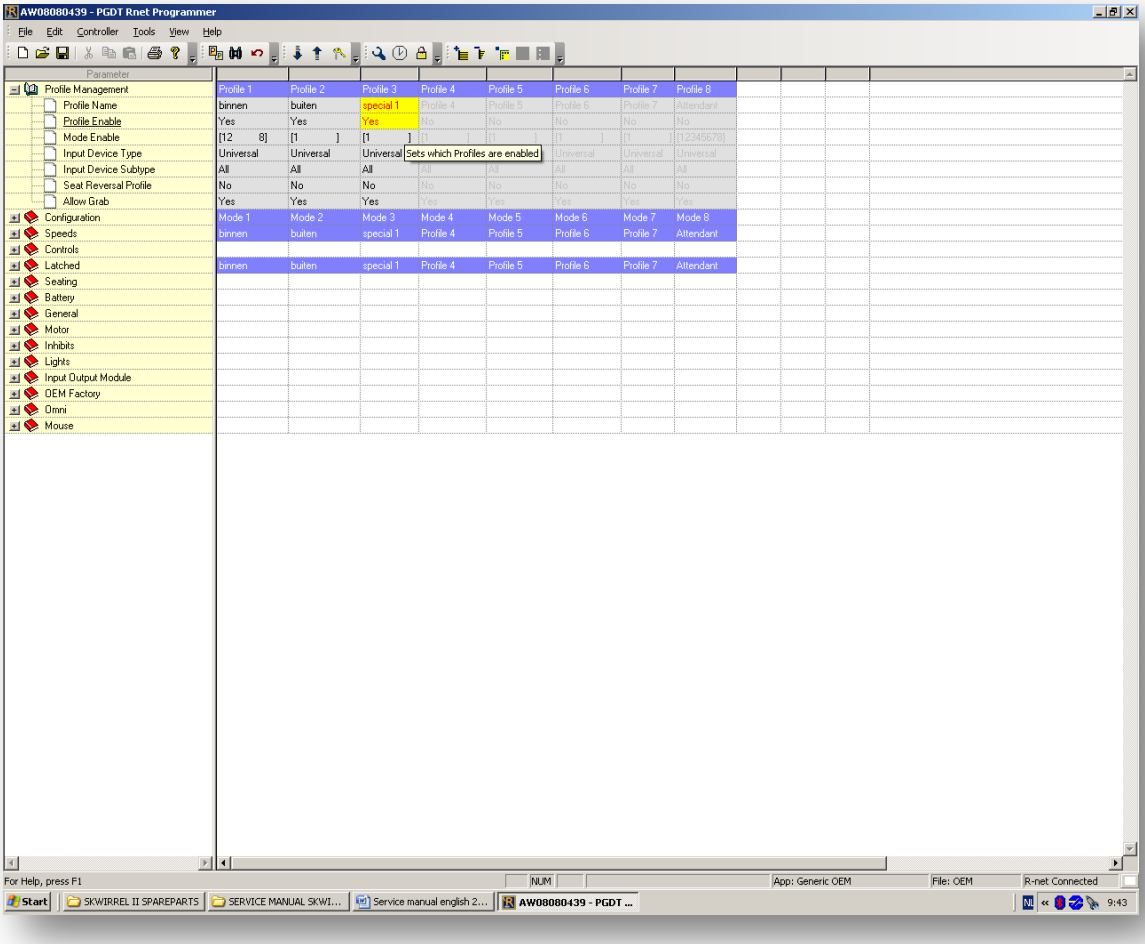


step 5.
To add a profile, double click on the field "profile name" of next empty profile column.



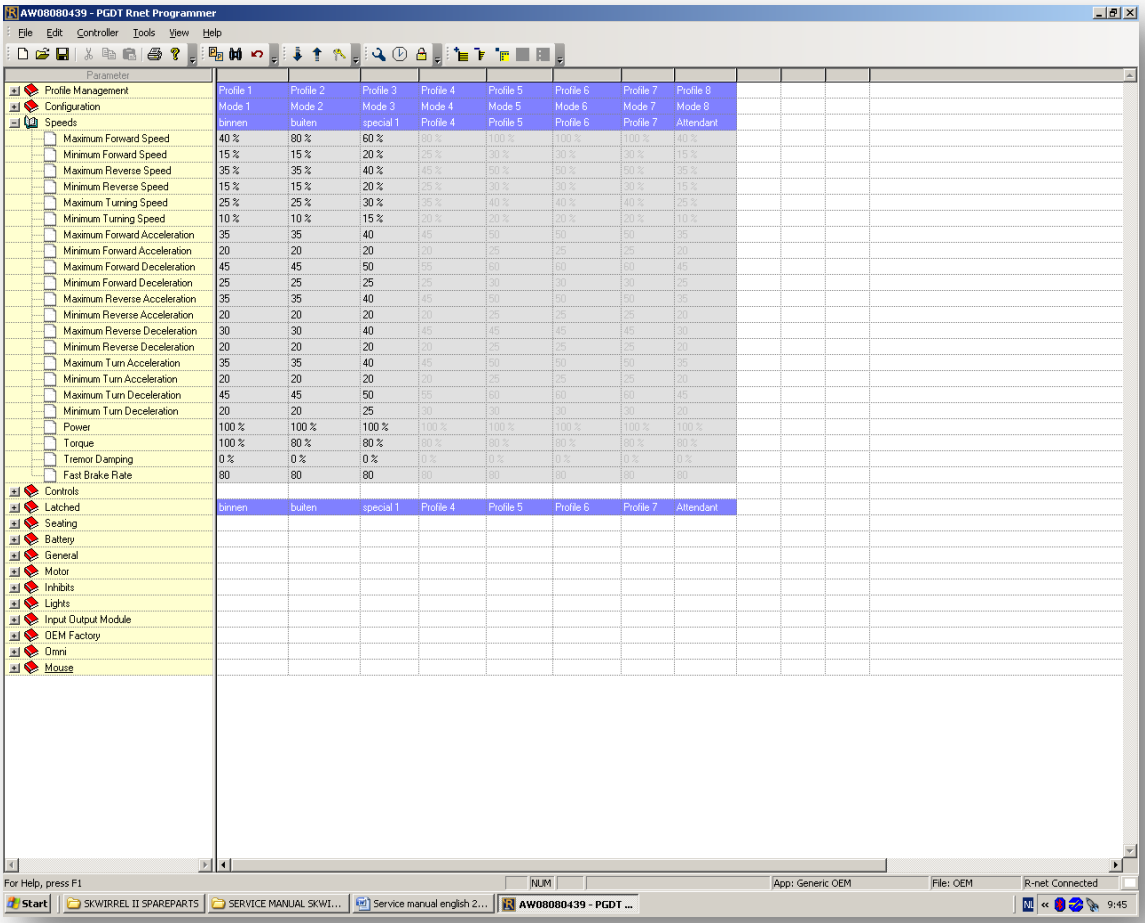
step 6.

Give the new profile a name. Double click on the box “profile enable” and select “yes” to activate the new profile. Now the new profile is activated. The next step will to set the driving parameters.



step 7.

Click on the + sign at the word “speeds” in the left column.



step 8.
Now you can set the different parameters for the new driving profile.

NOTE:
Detailed information can be found in the programming manual of the R-net system. If there is any hesitation or question about the programming, please contact Huka B.V.

14.3 setting the Speeds parameters.

Maximum Forward Speed - (Fwd Speed Max)
Sets the forward driving speed of the wheelchair when the joystick is deflected full ahead and the speed setting is at maximum (all 5 bars illuminated).
Programmable range is 0 to 100% in steps of 1%.

Minimum Forward Speed - (Fwd Speed Min)
Sets the forward driving speed of the wheelchair when the joystick is deflected full ahead and the speed setting is at minimum (just 1 bar illuminated).
Programmable range is 0 to Maximum Forward Speed in steps of 1%.
If the Maximum Forward Speed is set to a value less than the current value of this parameter,
then it will automatically be adjusted to the same as Maximum Forward Speed.

Maximum Reverse Speed - (Rev Speed Max)
Sets the reverse driving speed of the wheelchair when the joystick is deflected to full reverse and the speed setting is at maximum (all 5 bars illuminated).
Programmable range is 0 to 100% in steps of 1%.

Minimum Reverse Speed - (Rev Speed Min)
Sets the reverse driving speed of the wheelchair when the joystick is deflected to full reverse and the speed setting is at minimum (just 1 bar illuminated).
Programmable range is 0 to Maximum Reverse Speed in steps of 1%.
If the Maximum Reverse Speed is set to a value less than the current value of this parameter,
then it will automatically be adjusted to the same as Maximum Reverse Speed.

Maximum Turning Speed - (Turn Speed Max)
Sets the turning speed of the wheelchair when the joystick is deflected fully left or right and the speed setting is at maximum (all 5 bars illuminated).
Programmable range is 0 to 100% in steps of 1%.

Minimum Turning Speed - (Turn Speed Min)
Sets the turning speed of the wheelchair when the joystick is deflected full left or right and the speed setting is at minimum (just 1 bar illuminated).
Programmable range is 0 to Maximum Turning Speed in steps of 1%.
If the Maximum Turning Speed is set to a value less than the current value of this parameter,
then it will automatically be adjusted to the same as Maximum Turning Speed.

Maximum Forward Acceleration - (Fwd Accel Max)
Sets the acceleration rate of the wheelchair in the forward direction when the speed setting is at maximum (all 5 bars illuminated).
Programmable range is 0 to 100% in steps of 1%.

Minimum Forward Acceleration - (Fwd Accel Min)
Sets the acceleration rate of the wheelchair in the forward direction when the speed setting is at minimum (just 1 bar illuminated).
Programmable range is 0 to Maximum Forward Acceleration in steps of 1%.
If the Maximum Forward Acceleration is set to a value less than the current value of this parameter, then it will automatically be adjusted to the same as Maximum Forward Acceleration.

Maximum Forward Deceleration - (Fwd Decel Max)
Sets the deceleration rate of the wheelchair in the forward direction when the speed setting is at maximum (all 5 bars illuminated).
Programmable range is 0 to 100% in steps of 1%.

NOTE:
This deceleration setting is directly connected to the braking distance of the wheelchair. This is a parameter which has been set according to international safety regulations and should not be changed.

Minimum Forward Deceleration - (Fwd Decel Min)
Sets the deceleration rate of the wheelchair in the forward direction when the speed setting is at minimum (just 1 bar illuminated).
Programmable range is 0 to Maximum Forward Deceleration in steps of 1%.
If the Maximum Forward Deceleration is set to a value less than the current value of this parameter, then it will automatically be adjusted to the same as Maximum Forward Deceleration.

NOTE:
This deceleration setting is directly connected to the braking distance of the wheelchair. This is a parameter which has been set according to international safety regulations and should not be changed.

Maximum Reverse Acceleration - (Rev Accel Max)
Sets the acceleration rate of the wheelchair in the reverse direction when the speed setting is at maximum (all 5 bars illuminated).
Programmable range is 0 to 100% in steps of 1%.

Minimum Reverse Acceleration - (Rev Accel Min)
Sets the acceleration rate of the wheelchair in the reverse direction when the speed setting is at minimum (just 1 bar illuminated).
Programmable range is 0 to Maximum Reverse Acceleration in steps of 1%.
If the Maximum Reverse Acceleration is set to a value less than the current value of this parameter, then it will automatically be adjusted to the same as Maximum Reverse Acceleration.

Maximum Reverse Deceleration - (Rev Decel Max)
Sets the deceleration rate of the wheelchair in the reverse direction when the speed setting is at maximum (all 5 bars illuminated).
Programmable range is 0 to 100% in steps of 1%.

NOTE:
This deceleration setting is directly connected to the braking distance of the wheelchair. This is a parameter which has been set according to international safety regulations and should not be changed.

Minimum Reverse Deceleration - (Rev Decel Min)
Sets the deceleration rate of the wheelchair in the reverse direction when the speed setting is at minimum (just 1 bar illuminated).
Programmable range is 0 to Maximum Reverse Deceleration in steps of 1%.
If the Maximum Reverse Deceleration is set to a value less than the current value of this parameter, then it will automatically be adjusted to the same as Maximum Reverse Deceleration.

NOTE:
This deceleration setting is directly connected to the braking distance of the wheelchair. This is a parameter which has been set according to international safety regulations and should not be changed.

Maximum Turn Acceleration - (Turn Accel Max)
Sets the acceleration rate of the wheelchair into a turn when the speed setting is at maximum (all 5 bars illuminated).
Programmable range is 0 to 100% in steps of 1%.

Minimum Turn Acceleration - (Turn Accel Min)
Sets the acceleration rate of the wheelchair into a turn when the speed setting is at minimum (just 1 bar illuminated).
Programmable range is 0 to Maximum Turn Acceleration in steps of 1%.
If the Maximum Turn Acceleration is set to a value less than the current value of this parameter, then it will automatically be adjusted to the same as Maximum Turn Acceleration.

Maximum Turn Deceleration - (Turn Decel Max)
Sets the deceleration rate of the wheelchair while turning when the speed setting is at maximum (all 5 bars illuminated).
Programmable range is 0 to 100% in steps of 1%.

Minimum Turn Deceleration - (Turn Decel Min)
Sets the deceleration rate of the wheelchair while turning when the speed setting is at minimum (just 1 bar illuminated).
Programmable range is 0 to Maximum Turn Deceleration in steps of 1%.
If the Maximum Turn Deceleration is set to a value less than the current value of this parameter, then it will automatically be adjusted to the same as Maximum Turn Deceleration.

Power - (Power)
This reduces the power of the wheelchair. Power is the ability of a wheelchair to climb a hill or overcome an obstacle. If it is set to 100% then the wheelchair will provide full power. Values below 100% will result in reduced power. A typical use is minimizing damage to doorways or furniture if the wheelchair is being used indoors. The values can be set independently between drive profiles, meaning separate indoor and outdoor profiles can be defined.
Programmable range is 25% to 100% in steps of 1%.
If the value is set to less than 100%, then the boost current function is automatically disabled. I.e. the reduction is applied to the Current Limit Max. value.

Example: R-net is programmed to: Maximum Current Limit = 80 Amps
Boost Drive Current = 120 Amps
Boost Drive Time = 5 Seconds
Power (Profile 1) = 100%
Power (Profile 2) = 50%
This means that in Profile 1 the system will be able to output 120A for 5 seconds before reducing to 80A, but in Profile 2 will
output 50% of 80A = 40A with no boost.

Torque - (Torq)
This parameter can be used to boost the power to the motors at low drive speeds. This is useful for overcoming obstacles
such as door thresholds or thick pile carpets and for countering Roll-back.
Programmable range is 0% to 100% in steps of 1%.
At 0% the parameter has no effect. The recommended value is 80%, however, if the wheelchair drive is considered to be
jerky, then reduce this value.

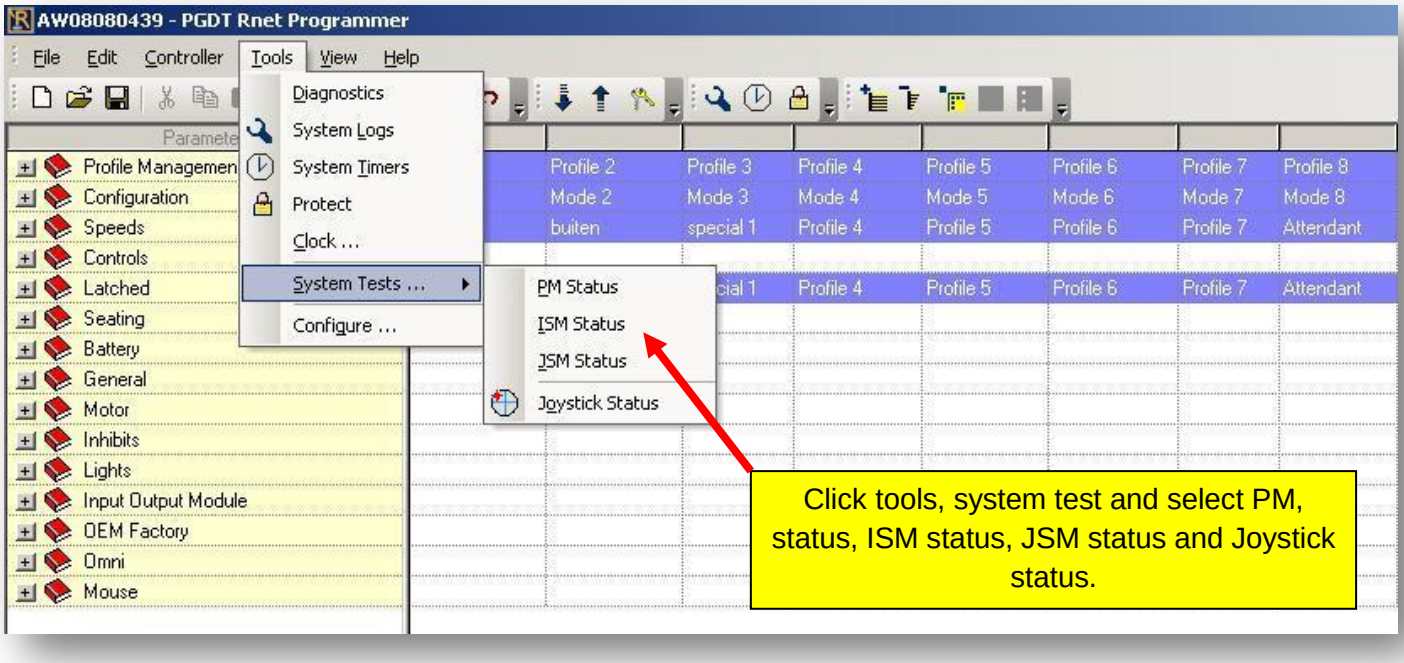
Tremor Damping - (Trmor)
This parameter can be used to reduce the effects of a user's hand tremor.
The programmable range is 0% to 100%. The higher the value, the greater the damping that is applied
If using high values of Tremor Damping, pay particular attention to the stopping distance of the wheelchair, as it will be increased.

Fast Brake Rate
This parameter sets the deceleration rate that is used while fast braking. Fast braking is when the joystick is pulled to the reverse position to make a faster stop.
The programmable range is 0 to 100.
If the value is set lower than the Forward Deceleration value, then the latter value will be used.

NOTE:
More detailed information can be found in the programming manual of the R-net system. If there is any hesitation or question about the programming, please contact Huka B.V.

15. System test

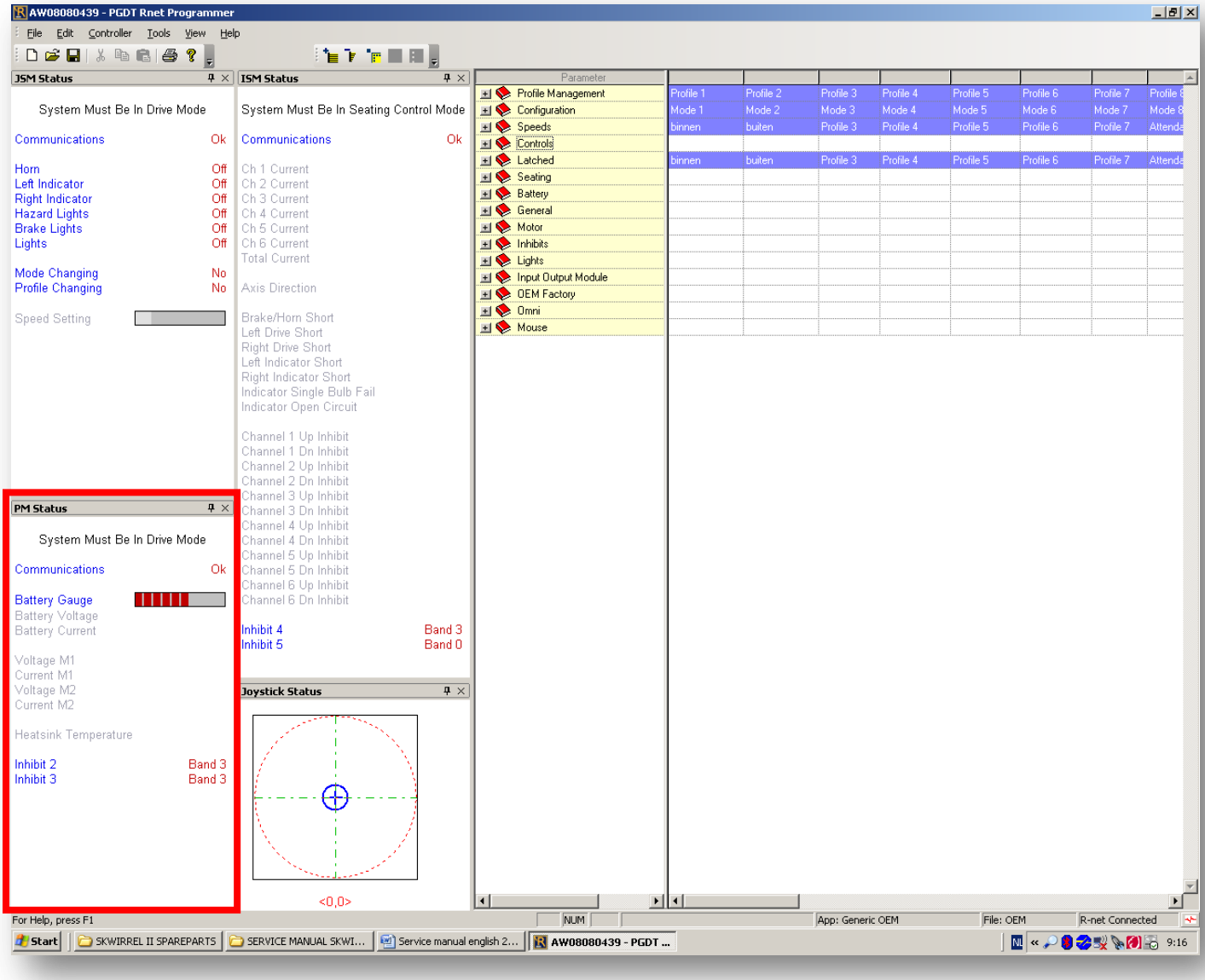
The software is also used to do some system testing. You can actually monitor the situation the wheelchair system is in. There are four monitors build in to the software: The PM status, the ISM, the JSM status and the Joystick status.



NOTE:
More detailed information can be found in the programming manual of the R-net system. If there is any hesitation or question about the programming, please contact Huka B.V.

15.1 PM status

Here you can find important information about the power module (PM).

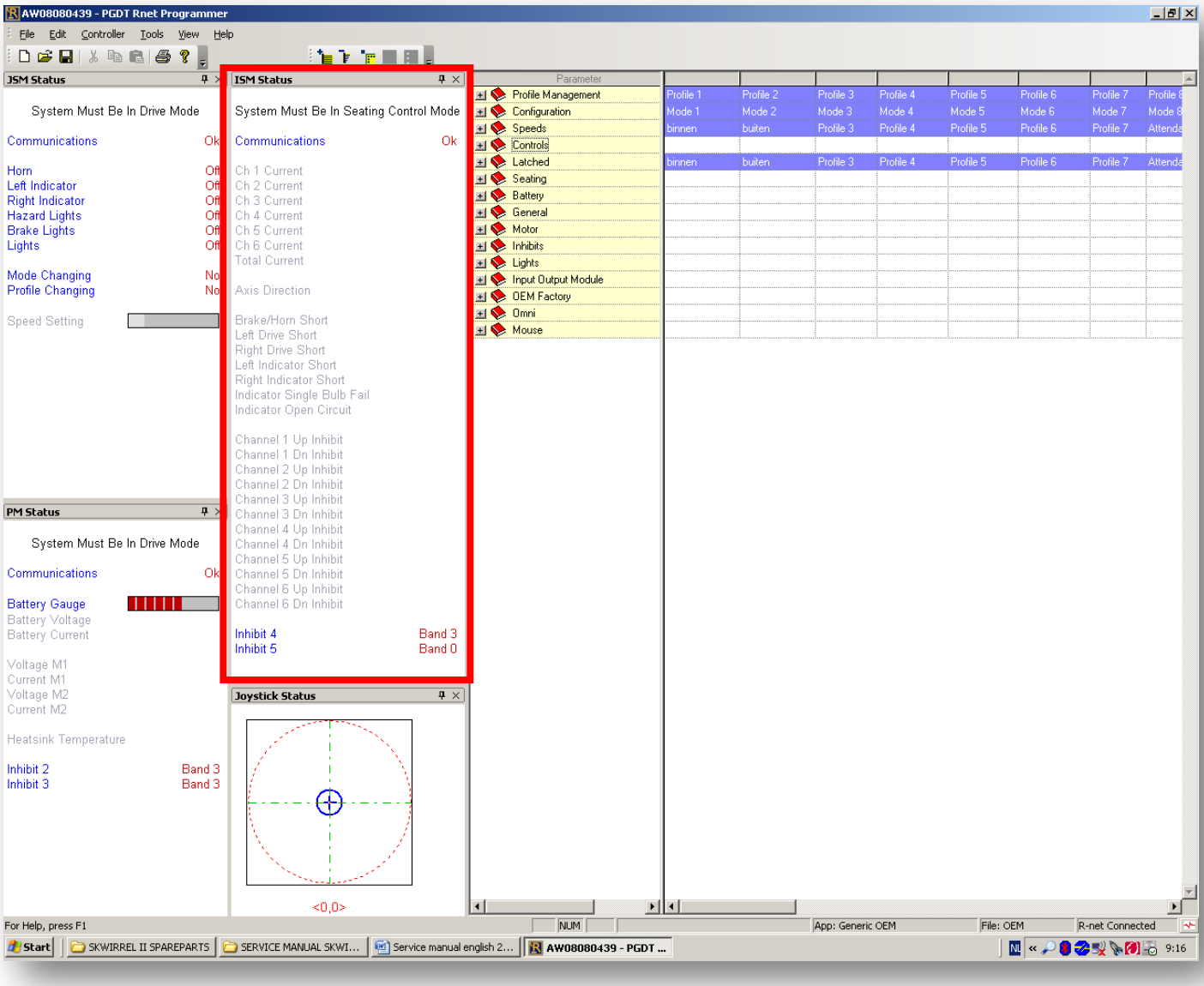


The PM status gives you direct information about:
- the communication
- battery status
- battery voltage
- battery current
- voltage of M1 (left motor)
- current of M1 (left motor)
- voltage of M2 (right motor)
- current of M2 (right motor)
- heat sink temperature
- position the safety inhibits are in.

Example:
If the current of motor M1 is much higher than the current of M2, this might indicate that motor M1 is running with more resistance. This could be the result of a broken ball bearing inside the motor.

15.2 ISM status.

Here you can find important information about the Intelligent Seating Module (ISM).

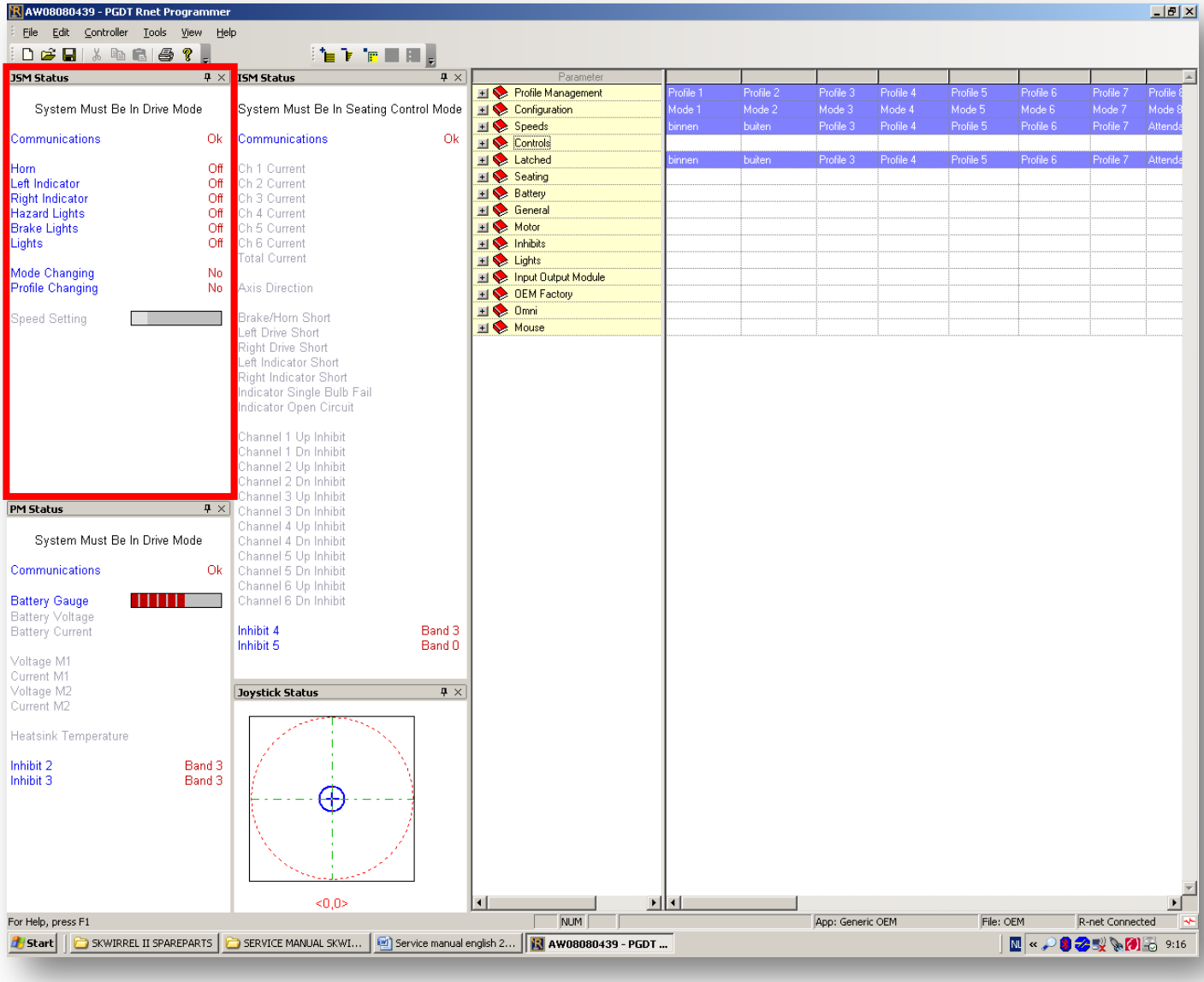


Here you can see, for example, how much current a certain seat adjustment actuator channel is using. If the indicator lights are working or which safety inhibit is active. Just by activating one of the seat functions on the wheelchair, you will see that the values are changing. This system monitors a perfect feedback of the wheelchair system. It is very easy to check here first to find out if all the functions are working properly.

NOTE:
More detailed information can be found in the programming manual of the R-net system. If there is any hesitation or question about the programming, please contact Huka B.V.

15.3 JSM status.

Here you can find important information about the Joystick Module (JSM).

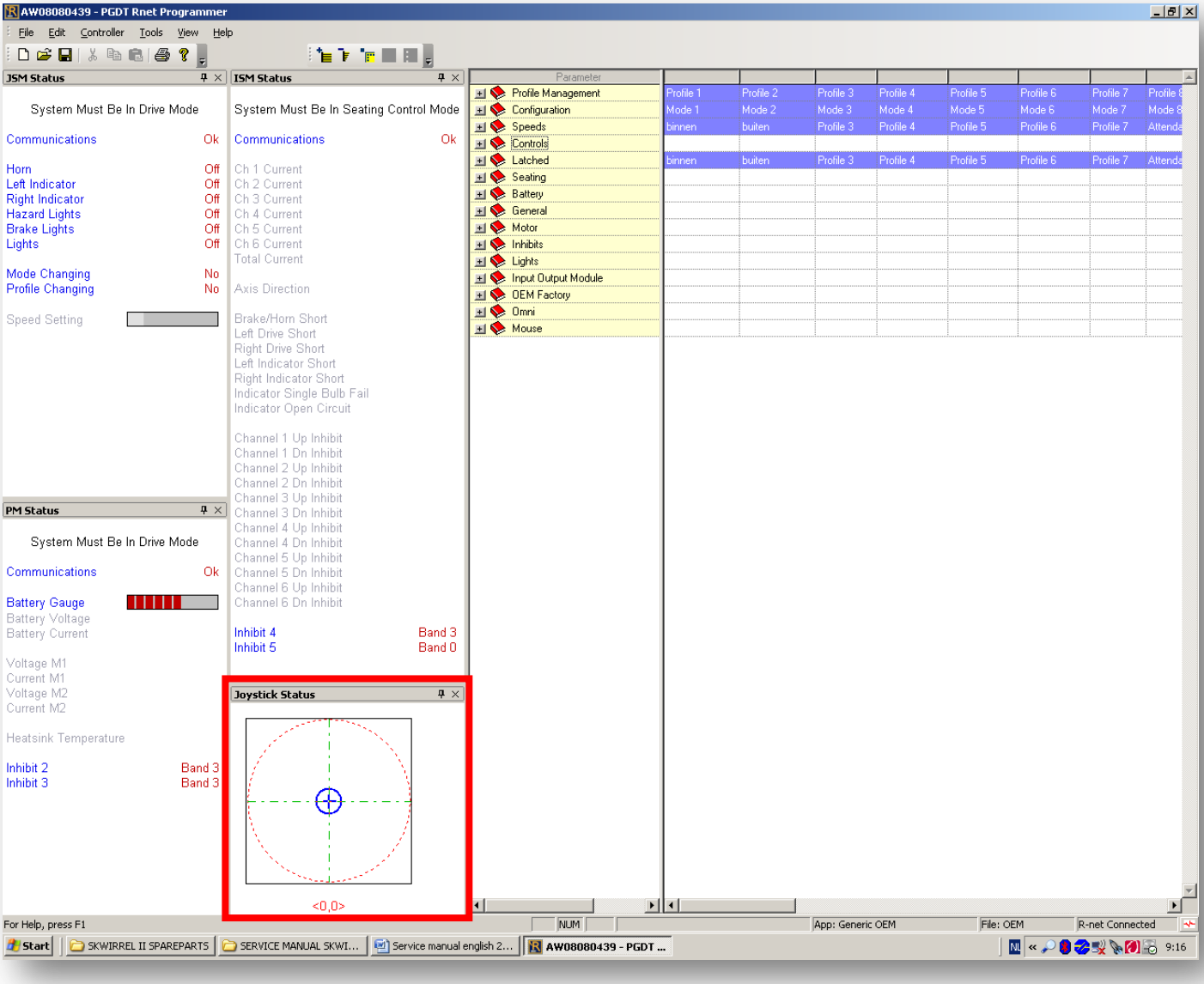


By pushing the buttons on the joystick module you can see on the system test of the value of this button is changing.

NOTE:
More detailed information can be found in the programming manual of the R-net system. If there is any hesitation or question about the programming, please contact Huka B.V.

15.4 Joystick status.

Here you can find important information about the Joystick.

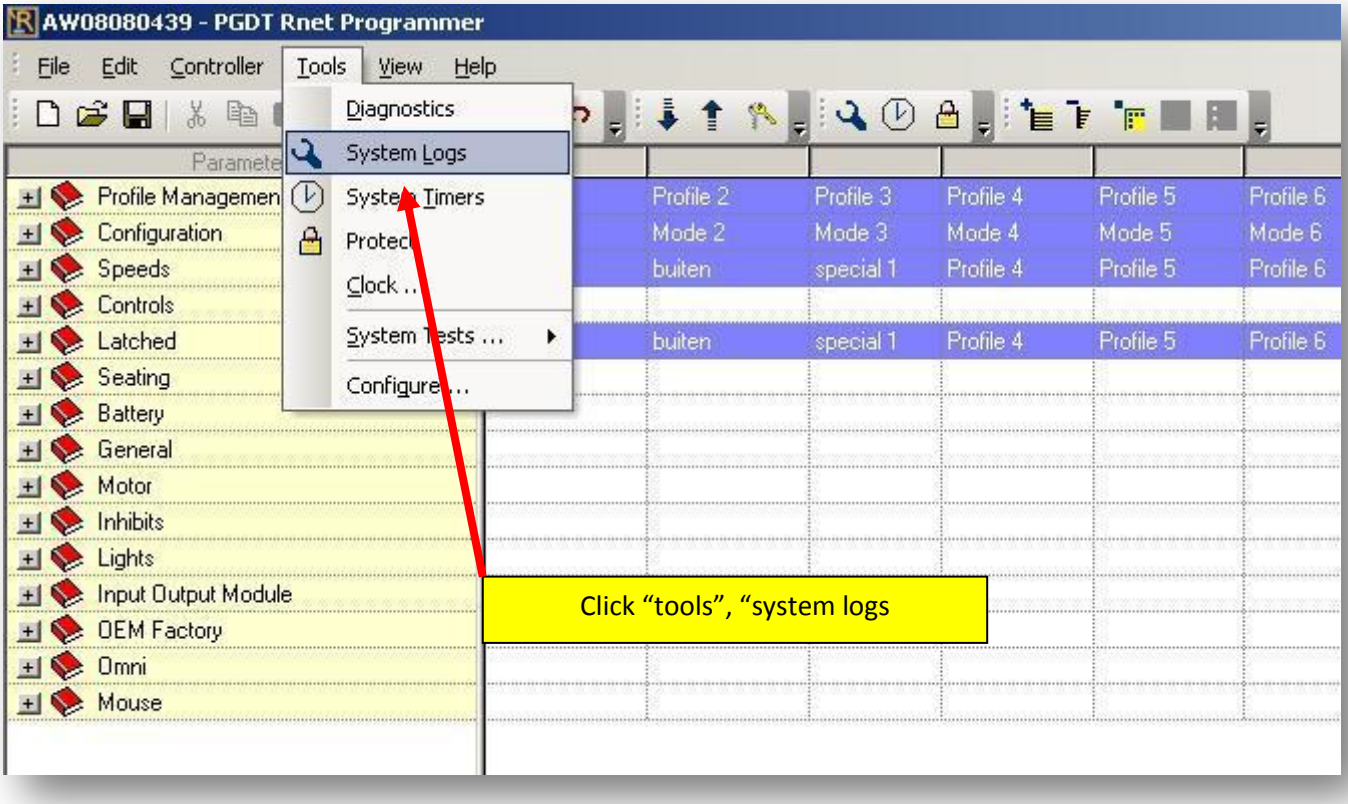


Here you can see if the joystick is working properly. Move the joystick and you will see the system tells you in which position the joystick is. Let the joystick go and the system will show you that the joystick had returned into the neutral position.

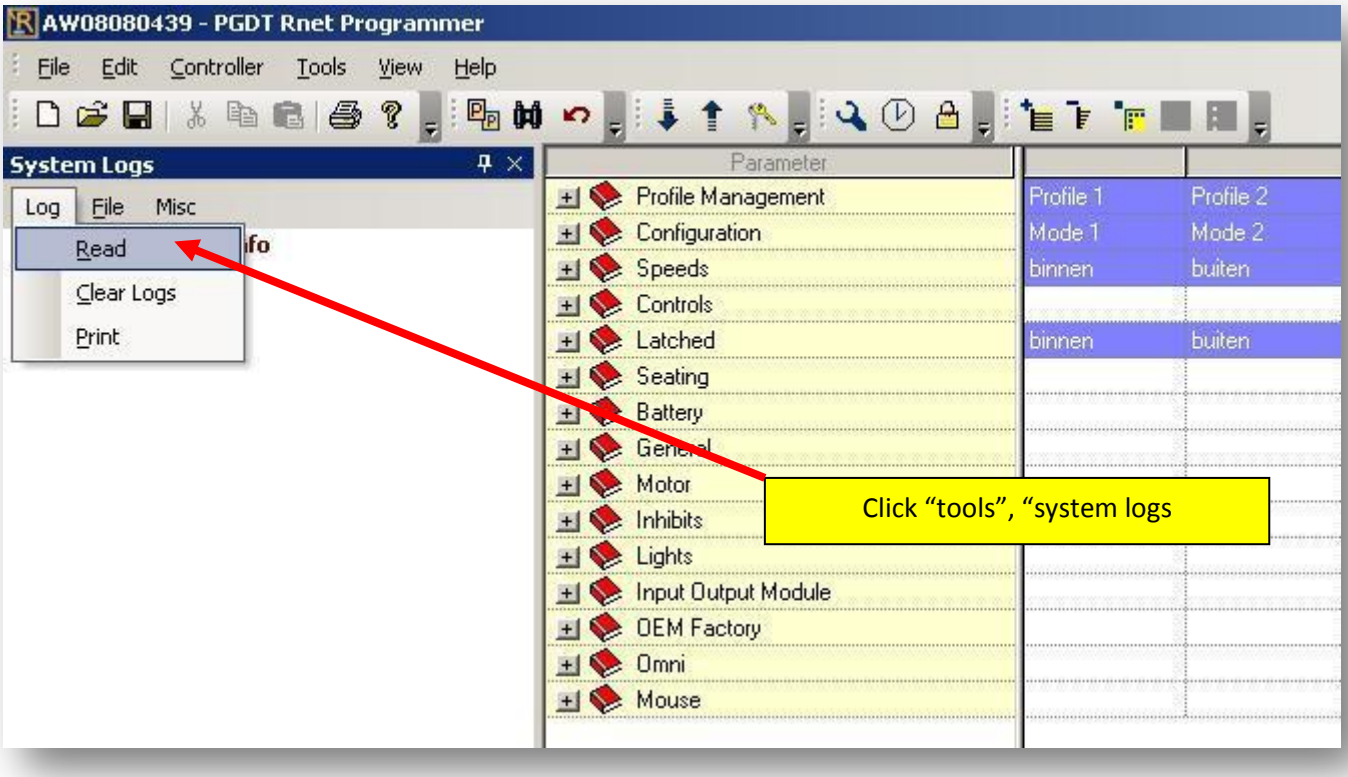
NOTE:
More detailed information can be found in the programming manual of the R-net system. If there is any hesitation or question about the programming, please contact Huka B.V.

15.5 system logs

R-net is also logging data about errors which occurred during the use of the wheelchair. These data logs are stored in the Joystick Module (JSM), the Intelligent Seating Module (ISM) or the Power Module (PM).

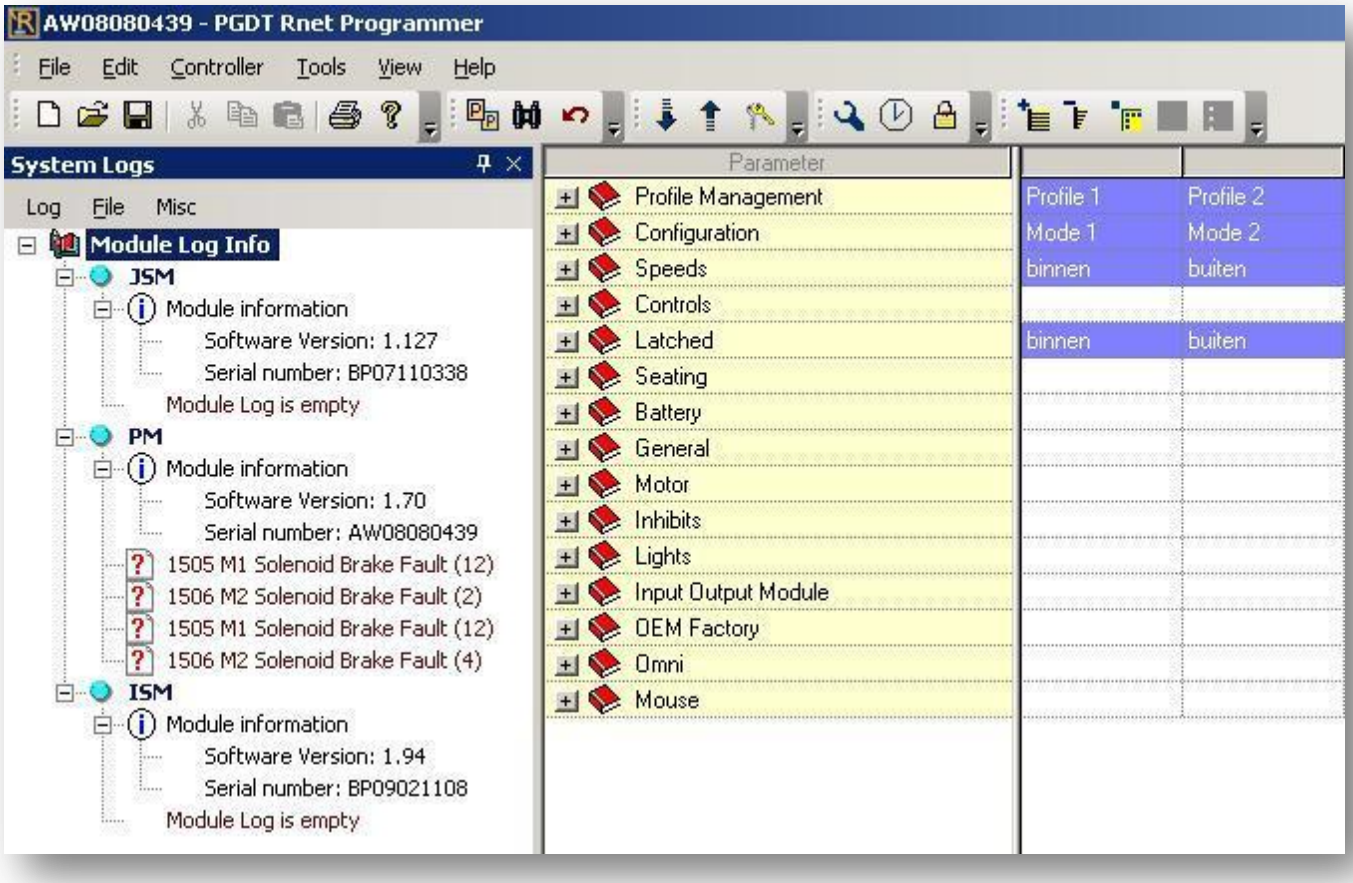


Now we can click on “read logs” to read the log files of the modules.



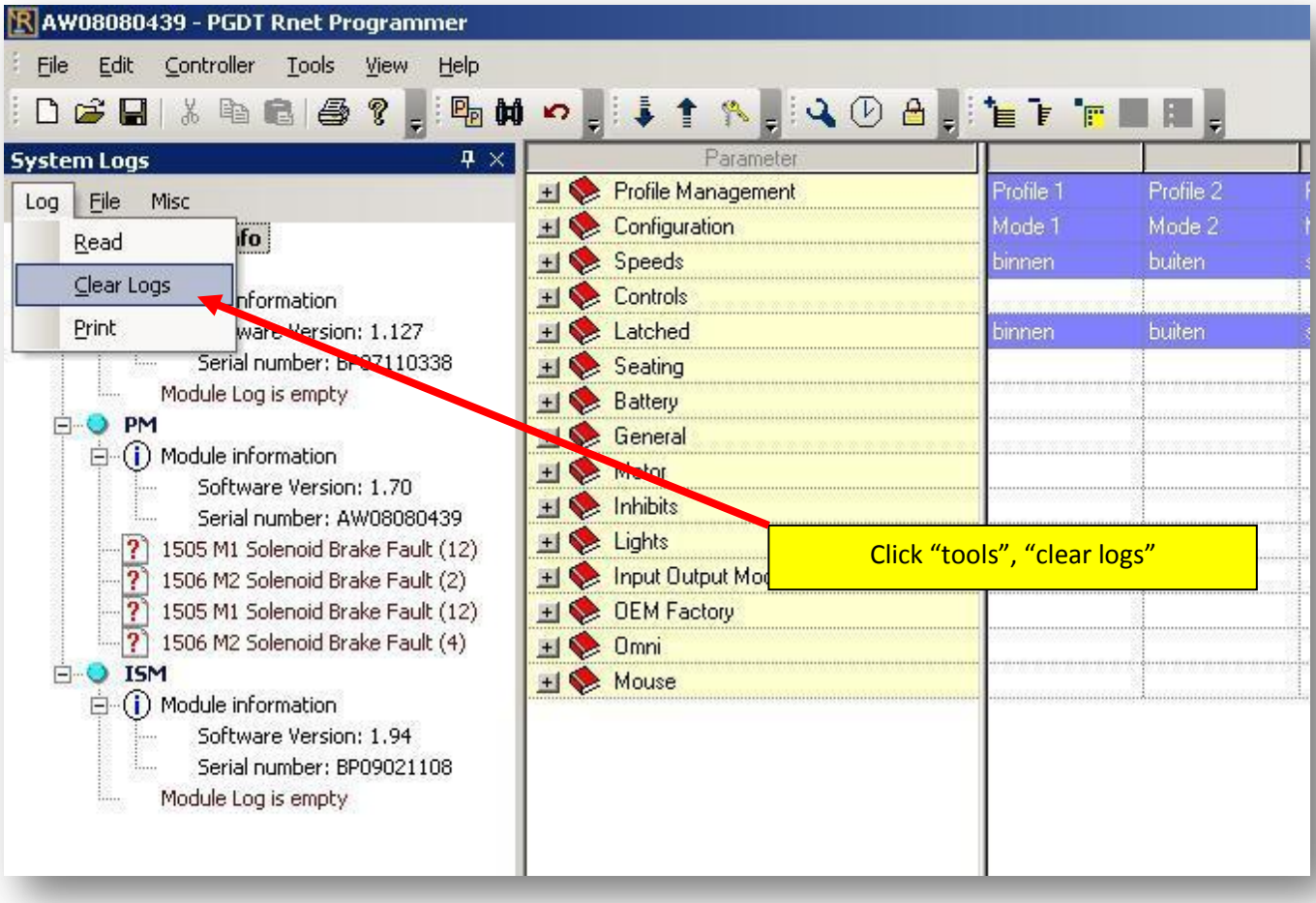
The software will now read and load all error logs into the computer.

Now we can see al logged information from each module.

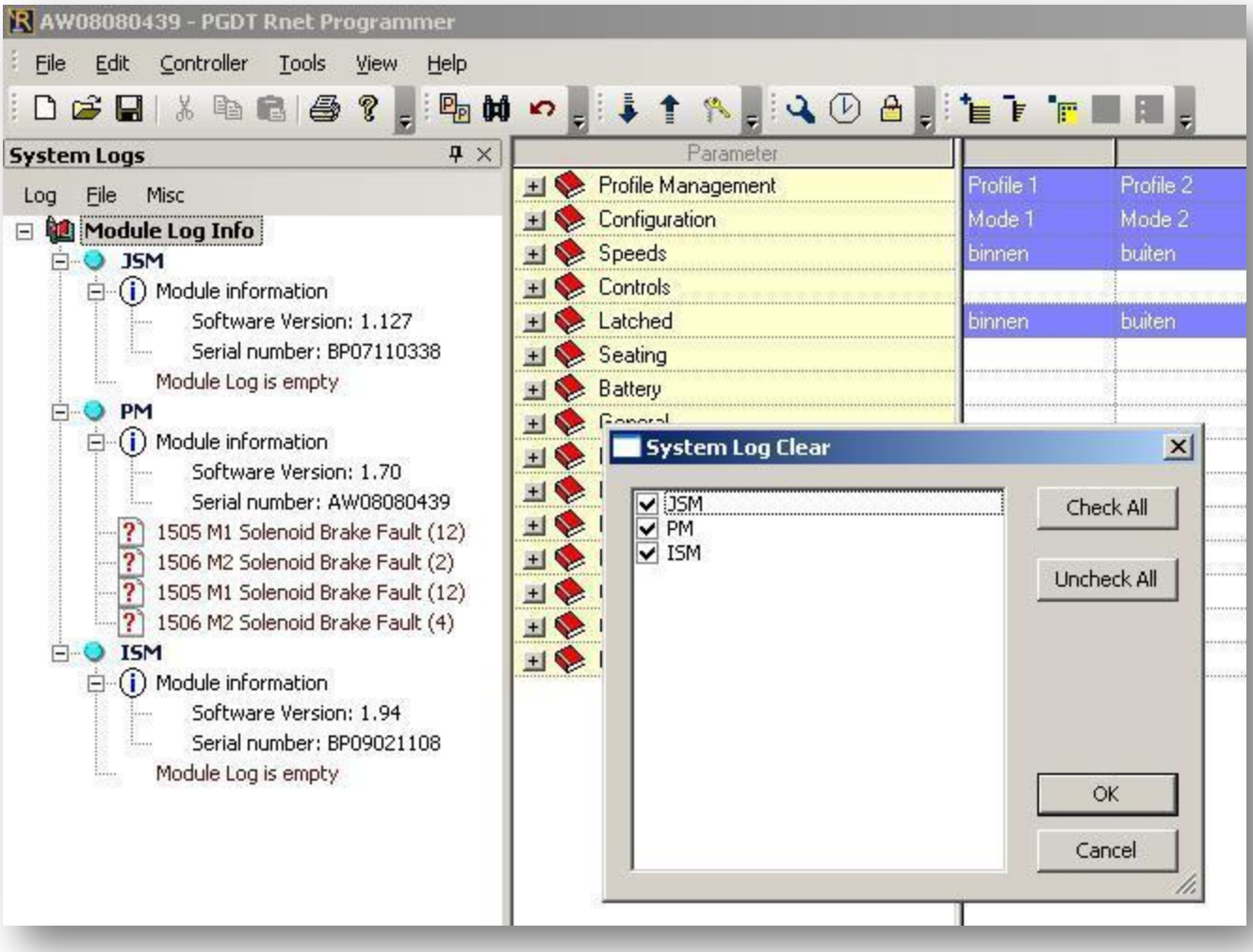


With these information's it is much easier to set the right diagnostics for repair.

After solving the problem it is best to erase the old logs. This way there is no more old information inside the system and all new messages will be stored again.

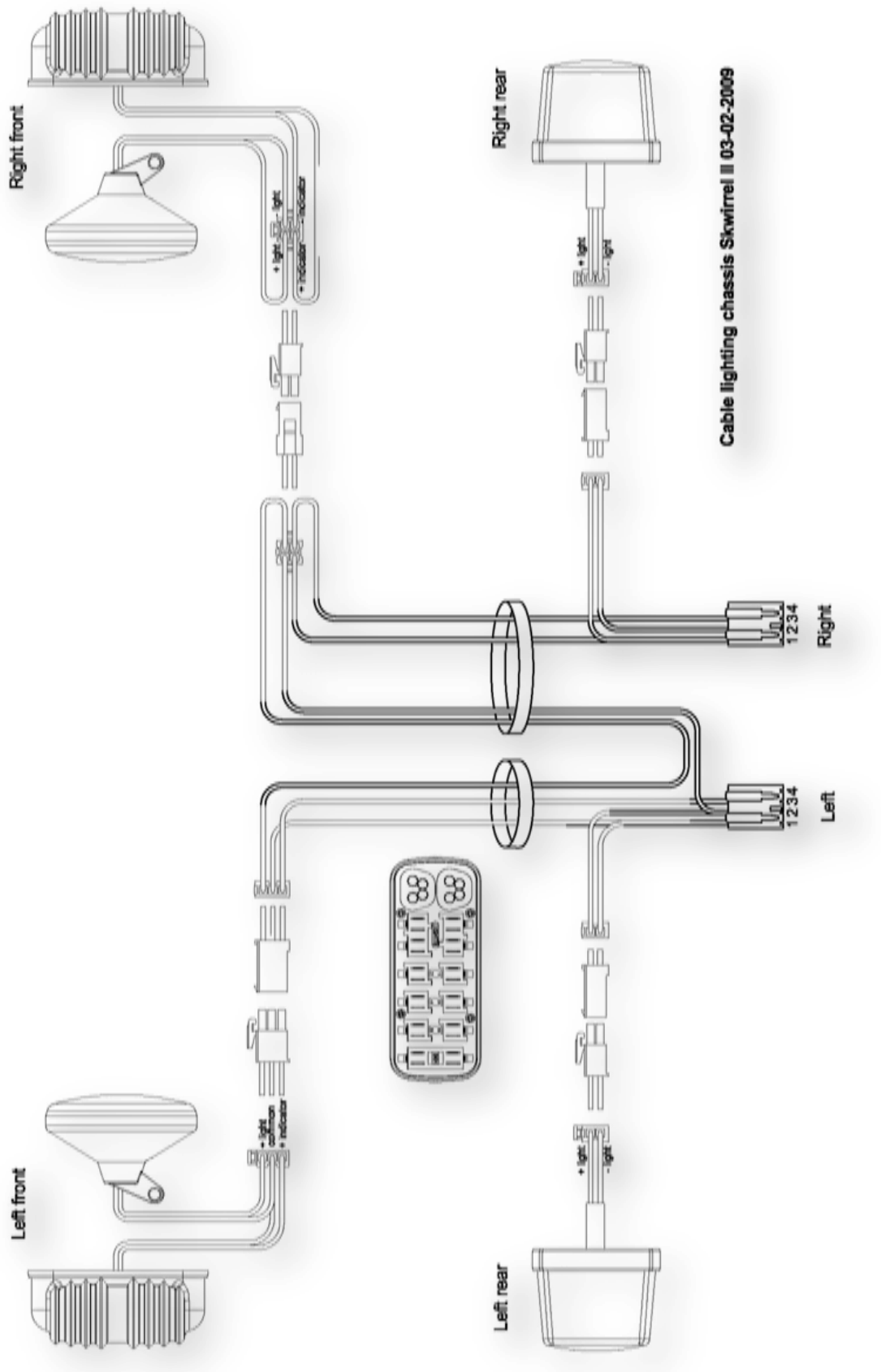


Click “check all” at the system log clear window. Now click on OK. The memory will be cleared.

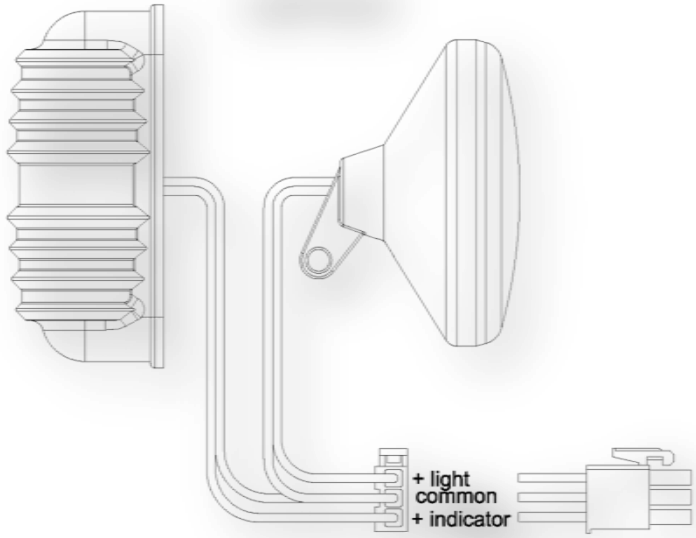


NOTE:
More detailed information can be found in the programming manual of the R-net system. If there is any hesitation or question about the programming, please contact Huka B.V.

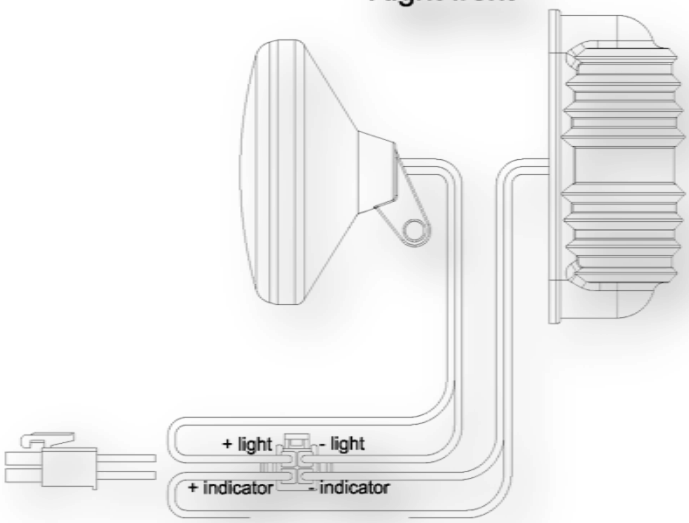
16. Drawings

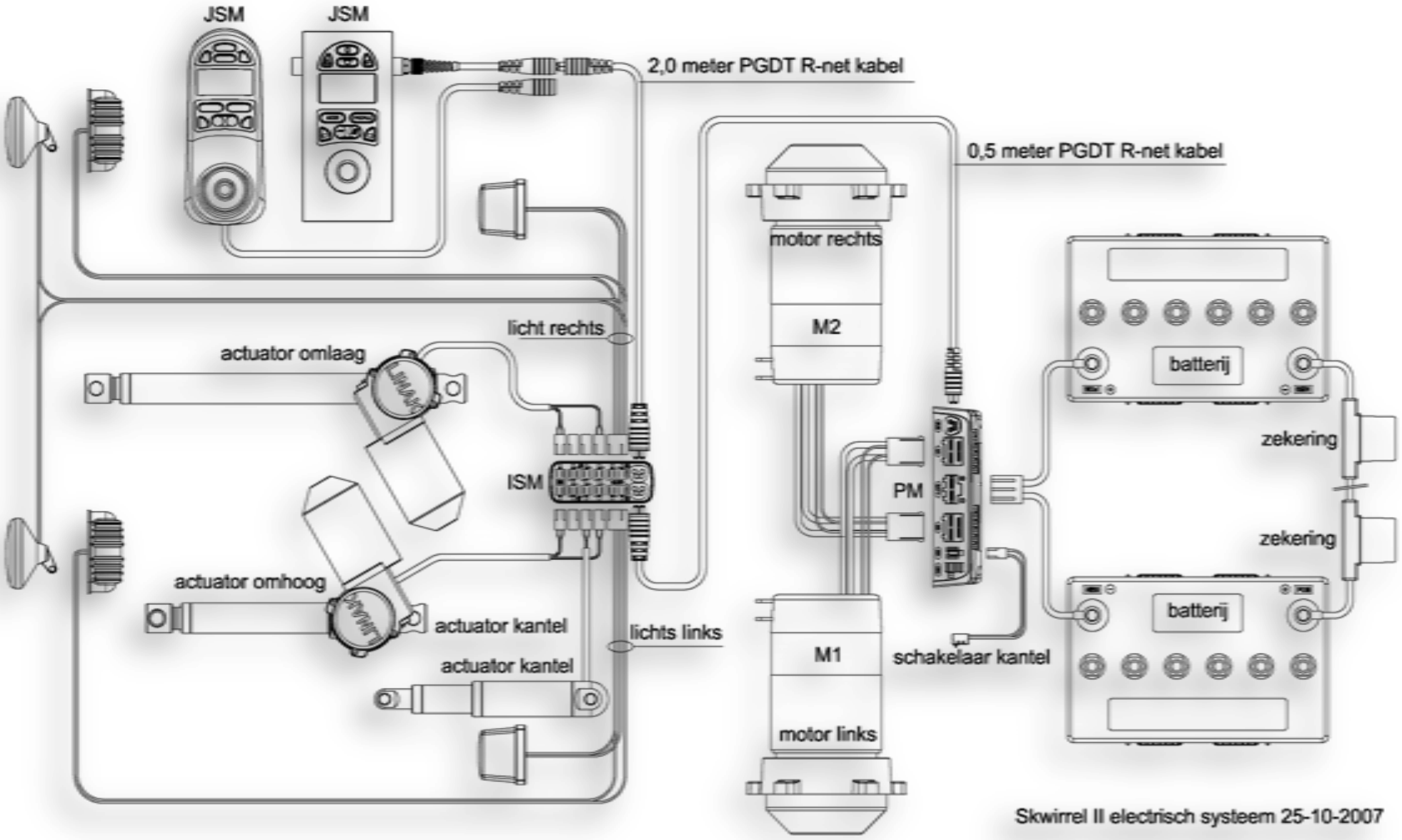

Cable lighting chassis Skwirrel II 03-02-2009
Right front
Right rear
Left front
Left rear
Right
Left
1234
1234

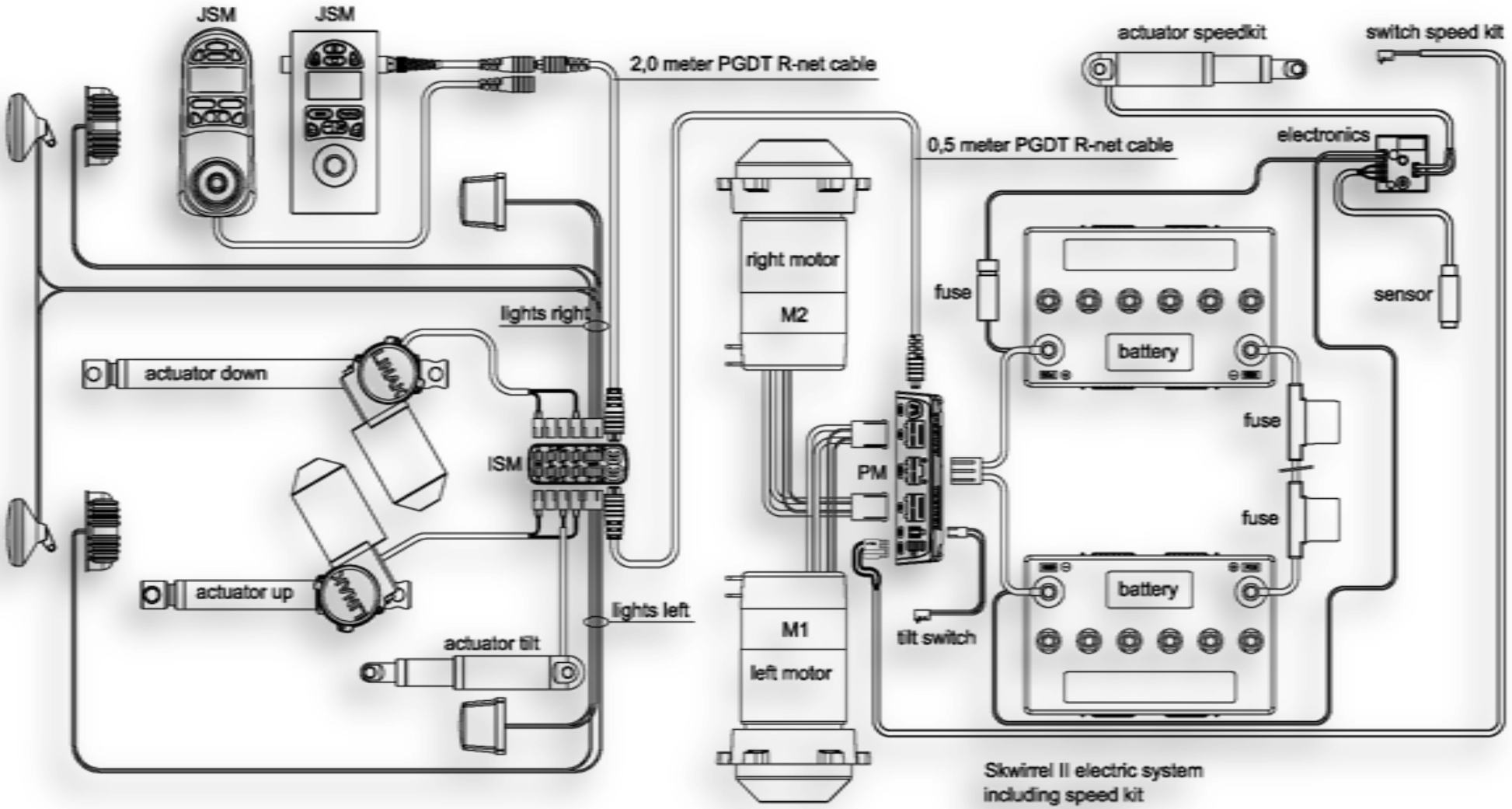
Left front



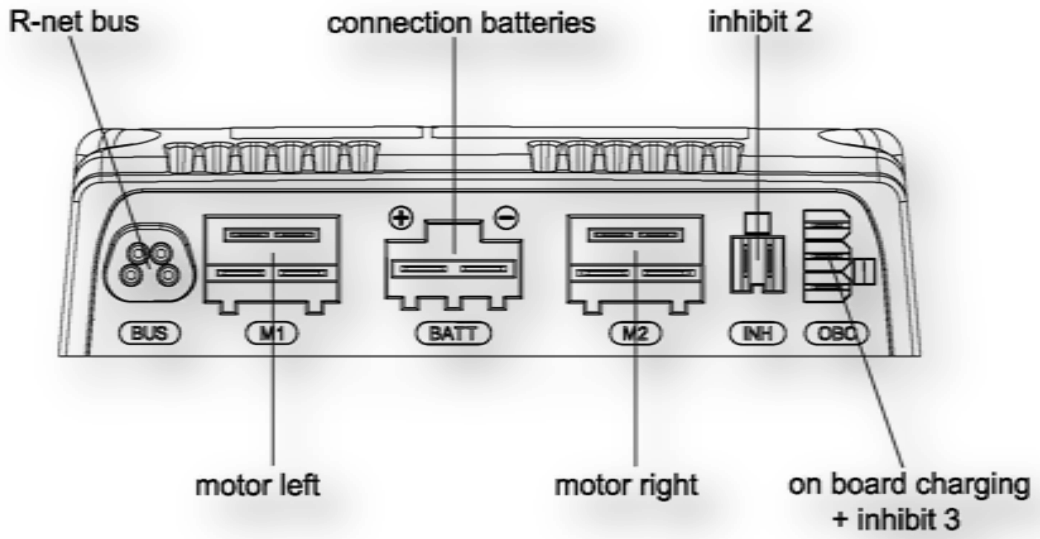
Right front




JSM
JSM
2,0 meter PGDT R-net kabel
0,5 meter PGDT R-net kabel
motor rechts
M2
licht rechts
actuator omlaag
ISM
PM
batterij
zekering
zekering
batterij
actuator omhoog
actuator kantel
lichts links
actuator kantel
M1
schakelaar kantel
motor links
Skwirrel II electrisch systeem 25-10-2007

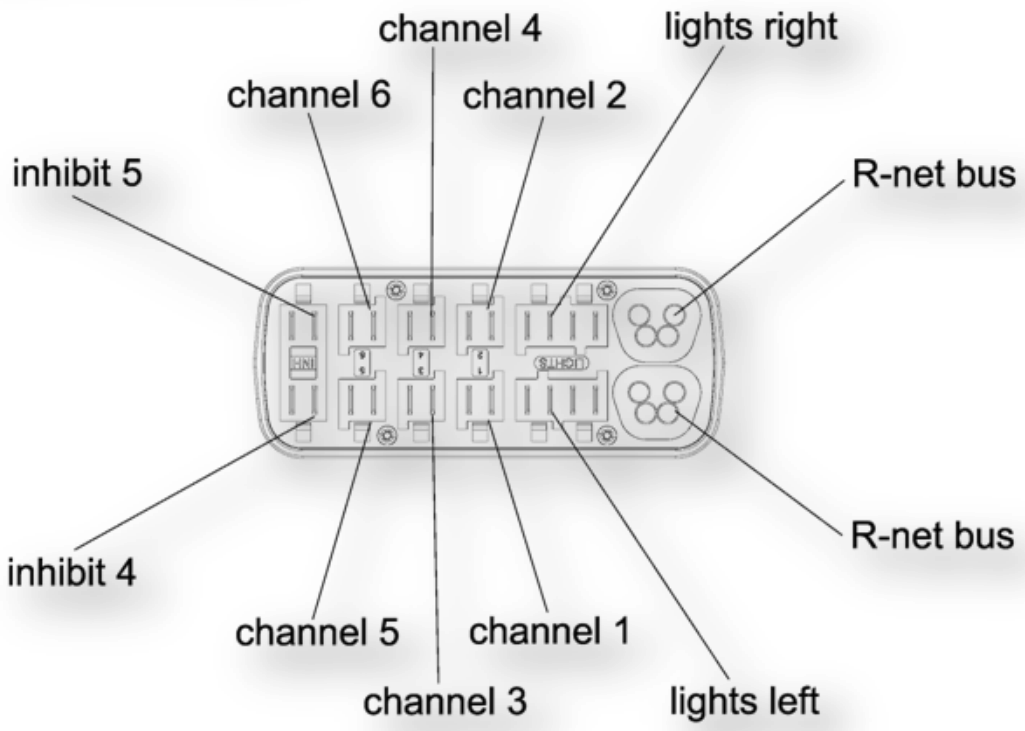

JSM
JSM
2,0 meter PGDT R-net cable
actuator speedkit
switch speed kit
0,5 meter PGDT R-net cable
electroniics
right motor
M2
fuse
sensor
lights right
battery
actuator down
ISM
PM
fuse
fuse
actuator up
battery
lights left
M1
left motor
tilt switch
actuator tilt
Skwirrel II electric system
including speed kit

PM Power Module



Connections PM Power Module
01-12-2007

ISM Intelligent Seat Module



Connections ISM Intelligent Seat Module
01-12-2007

NOTES:

Huka B.V.
Munsterstraat 13
7575 ED
Oldenzaal
The Netherlands
tel. +31 (0) 541 - 572 472
fax. +31 (0) 541 - 520 415
mail: info@huka.nl
www.huka.nl